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Modeling Individual Performance Criteria in the Air Force

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14. ABSTRACT
The purpose of the research report was to document the development of an alternate measure of individual job performance that reflects an airmen's total productivity during the first term. The sample was 25,000 airmen in 24 specialty groups across four years of service. The study was three phased. The first phase consisted of a definition of conceptual models and candidate measures reflecting airmen productivity in the first term. The second phase looked at the predictability of the criterion measures by scores on the ASVAB and other recruit quality measures. The final phase was a demonstration of the utility of the measures for addressing alternate selection and classification policies. (Continued on Back)

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The findings were that there were significant effects for aptitude; age at entry; educational attainment; gender and ethnic group; term and type of enlistment; waiver category; and occupational specialty assigned. Moderate to strong individual differences in length of service and attainment of journeymen status due to various enlistment factors were found to exist.

Executive Summary

The Challenge

Managing a large diverse workforce requires individual performance metrics for determining recruitment policies that best serve the overall interests of the organization. In the Air Force, recruitment guidelines cover various characteristics of an applicant's suitability for service including mental, moral, physical, and other background factors. Selection screens are determined by establishing appropriate feedback mechanisms and performance metrics that reflect the suitability of an airman's service and which permit enlistment policies to be fine tuned over time.

The Air Force has relied primarily on initial training criteria and to a lesser extent on premature attrition as ways to validate screening measures and determine which candidates are best suited for entry into service. Premature attrition is a useful metric for setting overall aptitude requirements for entry into the Air Force and training grades are useful for setting occupation-specific requirements for various job specialties. Both of these outcome measures have limitations in terms of how comprehensively they reflect the contribution a particular candidate will make on-the job.

The purpose of this project was to develop an alternate measure of individual job performance that reflected an airman's total productivity during the first term. The goal was to design and validate a simple but robust measure of job performance that could be generated from archival records on Air Force personnel and could be accurately replicated for future assessments of the impact of policy changes on applicant screening.

What We Did

We developed a composite measure of the contribution to mission readiness provided by individual airmen. The job performance indicator captured information about an airman's level of technical achievement during the first term and his/her longevity over the same period. We followed 25,000 airmen in 24 specialty groups across four years of service noting if and when they departed service and how quickly they advanced through skill progression from 1-level helpers to 3-level apprentices to 5-level journeymen.

Length of service and attainment of skill level were tracked for aptitude quality groups and education levels, age at entry, service commitments and demographic backgrounds. The composite measures of mission-readiness were characterized at the descriptive level to provide benchmarks for their use. Then prediction models were developed to validate the utility of the productivity metrics as indicators of job performance by determining their relationship with enlistment screening measures. As a further assessment of the utility of the job performance measures, a series of optimal assignment simulations were conducted to reflect the degree to which productivity might be improved under the most optimistic recruiting and assignment policies.

What We Found

We found moderate to strong individual differences in length of service and attainment of journeyman status due to the enlistment factors examined in the study. Overall, we found significant effects for aptitude, age at entry, educational attainment, gender and ethnic group, term and type of enlistment, waiver category, and occupational specialty to which the recruit was assigned. Generally, the most productive high-tenure groups were composed of older recruits with higher aptitude scores and more education who were enlisted for six-year terms (rather than four) and who did not require an enlistment waiver due to moral or other reasons.

To evaluate the value of the performance measure for simulating classification effectiveness of alternate AFS assignments, each airman's expected mean months of mission-ready service (MM-RS) was computed from within-group regression equations across 24 sample specialties. The purpose was to determine upper bound estimates of the amount of benefit that could be obtained by reassigning enlistees to specialty categories where the overall system-wide benefit would be greatest. Four benchmarks were established: 1) the optimum benefit level, 2) the minimum benefit, 3) the benefits expected from random reassignment and 4) the current level of benefit achieved from the enlistee's actual assignment. Results from these analyses showed that the lower and upper boundaries were 18.5 and 27.40 MM-RS per recruit respectively. The random assignment value was 23.25 and the actual value obtained by current accession procedures was 24.22. This indicates that current accession policy increases the average amount of MM-RS about +1 month per enlistee over the random assignment value. Potential increases of + 4 months (27 MM-RS – 23 MM-RS) were shown to be possible under optimal assignment circumstances. Increasing the applicant pool so that the service could be more selective was found to have a positive but progressively decreasing return on investment. This was due to the increasing number of recruits needed to raise the rejection rate significantly beyond 10 or 20% and the rising incremental cost for each additional recruit.

Impact and Implications

The study demonstrated the feasibility of combining variables routinely collected and readily available on enlisted personnel in archival files to obtain an indicator of their productivity and contribution to Air Force mission readiness during the first four years of service. The utility of the measures for detecting individual differences in job performance were shown through expected relationships with entry-level screening measures. Further, the assignment simulation results demonstrated the value of the mission-ready productivity indicator for determining system-wide benefits of alternate recruitment and assignment policies. The productivity indicators would be a useful metric in future studies for establishing more refined selection criteria based on the impacts on entrants' longevity and acquisition of skill levels indicative of journeyman-level job performance.

Preface

This report is the primary deliverable for Contract No. FA3089-06-F-0489, Job Performance Analyses, awarded to Operational Technologies Corporation, San Antonio, Texas, starting 1 October 2006. The Air Force project manager was Mr. Kenneth Schwartz, Chief, Force Management Liaison Office, Air Force Personnel Center, Randolph Air Force Base, Texas. Project guidance and support was also provided by Mr. Johnny Weissmuller, Deputy, Force Management Liaison Office. We appreciate Mr. Schwartz and Mr. Weissmuller's support of the effort and the opportunity to explore potential improvements in job performance measurement technology.

Dr. C. Wayne Shore, Operational Technologies Corporation, provided executive oversight and direction. Dr. William E. Alley was the project leader and technical director of the project. Dr. Leticia J. Pacheco led the data analysis effort assisted by Mr. David B. Birkelbach. Dr. R. Bruce Gould, Mr. Frank Whitaker, and Mr. Clarence Johnson accomplished data base design and development activities. Dr. Jacobina Skinner assisted with composition and preparation of the project documentation.

Dr. Alley provided a project kickoff briefing in October 2006 and interim progress briefings to the Air Force in May, June, and July 2007. The briefings were attended by Mr. Schwartz and Mr. Weissmuller, project managers at HQ AFPC/DPST, and by representatives of Headquarters USAF, Air Force Personnel Center, Air Force Recruiting Service, Occupational Measurement Squadron, and Air Force Research Laboratory. The authors would like to acknowledge the insightful reviews and comments provided by Dr. Paul Ditullio, Capt. Brian Calkin, Dr. Lisa Mills, and Dr. Tom Carretta during the ongoing work described in the report.

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MODELING INDIVIDUAL PERFORMANCE CRITERIA IN THE AIR FORCE

I. INTRODUCTION

Managing large diverse workforces in the Department of Defense (DoD) requires mechanisms for determining whether recruitment policies serve the overall interests of each branch of service. In the Air Force, guidelines for recruitment cover various aspects of an applicant's suitability for service including mental, moral, physical and other background factors deemed relevant to the evaluation process. Some aspects of the screening process are determined by management consensus such as the policy to deny enlistment to applicants with prior histories of drug abuse. Other aspects of the selection decision are governed by legal restrictions which preclude entry, for example, by applicants scoring in the bottom percentiles on aptitude screening measures. Still other aspects of the selection screen are determined by setting up appropriate feedback mechanisms about the suitability of an airman's service that permit fine tuning of enlistment policies over time. This typically involves a careful follow-up of enlistee characteristics from service entry through training and onto the job to determine whether aptitude and background factors can be related positively or negatively to success in the military.

For the components of the recruitment screening process that are data driven, the Air Force has relied primarily on indicators of recruits' suitability during the initial four years of services. The principal criteria for determining which candidates are best suited for entry into service has been based on initial training outcomes, and to a lesser extent, on premature attrition data. Premature attrition outcomes are useful in setting overall aptitude requirements for entry into the Air Force whereas training grades are useful for setting occupation-specific aptitude and education requirements for various job specialties. Each of these criterion measures has limitations on how well it depicts the overall contribution that a particular candidate will make on the job. Training grades measure achievement levels during initial technical training programs lasting an average of approximately 11 weeks although some are shorter and many are longer lasting up to 52 weeks. Attrition analysis usually follows entrants through the first several years of service to determine who remains on active duty at end-of-year check points. Since enlistees also progress through a comprehensive program of skill upgrade from the unskilled level through apprentice to journeyman status, their relative rates of progression through this system can be tracked. A more relevant and comprehensive measure for evaluating recruitment policies would capture information about recruits' length of service and level of technical achievement in the skill upgrading system and likely provide a better overall indicator of individual productivity during the first term.

II. BACKGROUND

Prior efforts to measure job performance and productivity during recruits' initial service commitments have been extensive but in many cases were expensive and occurred only on a periodic and non-recurring basis. A review of these efforts is worthwhile in any attempt to develop a more practical criterion methodology. It has been noted that compared to the time and resources invested in predictor research, criterion measurement is widely considered to be a largely neglected area of applied psychology (McCloy, Campbell, Knapp, Strickland, & DiFazio, 2006).

Hands-on Performance Measurement

The most concentrated effort on job performance measurement, although large in scope, resulted in limited applications. In 1981, the Services began a systematic research program to develop measures of job performance in a small number of selected specialties. The ultimate purpose was to link enlistment standards, at least on a limited basis, to performance on the job (Wigdor & Green, 1991). Each branch of military service participated in the project and initiated a program of performance measurement research. Policy makers in Congress and the DoD mandated the efforts for purposes of establishing an empirical relationship between recruits' scores on the ASVAB and their actual job performance. The job performance data were intended to extend prior research on ASVAB validity from the schoolhouse to actual performance on the job. Substantial prior research found that military service applicants' scores on the ASVAB were predictive of their later level of achievement in military technical training courses (Welsh, Kucinkas, & Curran, 1990; Welsh, Trent, Nakasone, Fairbank, Kucinkas, & Sawin, 1990). The Services have used these relationships as a basis for selection and classification decisions for many years.

Hands-on work sample tests were identified as the primary indicator of job performance to be measured in the project by each of the Services (Wigdor & Green, 1991). Hands-on tests are work samples requiring job incumbents to actually perform a military task in the workplace with the tools and equipment used on the job. Elements of correct performance were scored by trained observers and task scores were obtained. The validity of the Armed Forces Qualification Test (AFQT) composite of the ASVAB for predicting hands-on performance measures was reported to the House Committee on Appropriations in 1989. Test-performance relationships were reported for 23 military occupations, eight of which were Air Force specialties (Teachout, 2007). The correlations showed that overall the AFQT had a positive relationship with hands-on performance, but the validities were generally smaller in magnitude than those obtained using technical training grades as criteria.

The National Academy of Science, which provided technical review for the research program, concluded that the job performance measurement project succeeded in demonstrating that hands-on measures of job performance could be developed for a wide range of military jobs and that the ASVAB predicts these measures with a useful degree of validity. They pointed out that a remaining task was to use the results to link enlistment standards to job performance. Work continued to develop methods for linking recruit quality requirements, costs, and job performance data (Green, Wing, & Wigdor, 1988; Hogan & Harris, 1994; Smith & Hogan, 1994). However each of the Services retained occupational classification standards based on previously determined aptitude and training performance relationships.

Besides the hands-on performance measures, which were the focus of the joint-service job performance measurement program, each of the Services was given responsibility and latitude to explore additional criterion measurement methods. The hands-on measures were used as benchmarks against which alternate measures could be compared. The Air Force examined several methods including walk-through performance tests (Hedge & Teachout, 1986; Lipscomb

& Hedge, 1988; Teachout, 2007). Walk-through performance testing was an extension of hands-on performance measurement. Subjects were asked to actually perform selected tasks to demonstrate their proficiency. An additional interview component required the subjects to describe the step-by-step procedures they would complete to successfully perform each task (Gould & Hedge, 1987; Hedge & Lipscomb, 1987). The interview approach was a less expensive but still a time-consuming alternative to hands-on testing. Air Force analyses consistently showed that both aptitude and experience were related to hand-on and walk-through performance measures (Alley & Teachout, 1990; Lance, Hedge, & Alley, 1987).

Productive Capacity

The Air Force also conducted research and development on the concept of productive capacity. Unlike hands-on and walk-through tests, the focus of productive capacity measurement was on quantity rather than quality of performance. The concept and methodology were introduced by Carpenter, Monaco, O'Mara, and Teachout (1989) and later extended by other Air Force researchers (Borman, Hedge, Cook, Harville, & Skinner, 1994; Faneuff, 1993; Faneuff, Valentine, Stone, Curry, & Hageman, 1990). Productive capacity (PC), a time-based index of job performance, quantifies an individual's potential work output as a proportion of maximum possible performance and can be expressed mathematically as T*/T. The value T* was defined as an estimate of the shortest possible performance time on a unit of work and T as the time required for a worker to complete the same work. By averaging across multiple units of work or job tasks, the productive capacity of an individual airman in a particular Air Force Specialty (AFS) was

$$PC_a = \frac{1}{n}\sum_{i=1}^{n}\left(\frac{T_i^*}{T_{a,i}}\right)$$

where,

PC_a = Productive capacity of airman *a*
T_i^* = Fastest possible performance time for task *i* (*i* = 1 to n)
$T_{a,i}$ = Airman's actual performance time on task *i*

A worker with PC = .75 performs a unit of work at a rate which is 75 percent of the estimated maximum performance. Further, the worker with PC = .75 can be said to have a work output equivalent to three workers with PC = .25. The PC metric was seen as potentially useful for examining trade-offs among alternative manpower mixes, an important consideration in developing efficient force management policies.

Productive capacity scores were derived from supervisors' estimates of incumbent task performance times and actual performance times by incumbents. Carpenter, Monaco, O'Mara and Teachout (1989) examined one Air Force electronics specialty and developed a prototype optimization model using relationships among aptitude, experience, productivity, and cost to set enlistment standards. Job experience and aptitude were found to relate to PC. The work of Carpenter et al. was expanded by researchers who introduced multiple AFSs, recruiting market constraints, and quality cost differentials using hypothetical data (Faneuff, Valentine, Stone,

Curry, & Hageman, 1990). Other efforts focused on field data collection from additional AFSs using methods designed to improve the reliability and validity of task time measures (Leighton, Kageff, Mosher, Gribben, Faneuff, Demetriades, & Skinner, 1992; Skinner, Faneuff, & Demetriades, 1991). Although measurement strategies were complex and labor intensive, analyses revealed that aptitude and experience relationships were obtainable for the time-based measures at the task level. In an attempt to develop a lower cost alternative, occupational survey data which are readily available on a large number of AFSs was also explored as a source for generating productive indexes on airmen (Stone, Turner, Wiggins, Skinner, Looper, & Grobman, 1996). The occupation productivity index, which accounted for the number and difficulty of tasks performed, obtained a rank order for airmen that compared favorably to a similar estimate from walk-through performance tests.

Productive capacity was of interest to Air Force personnel planners and managers as a potential measure of relative work output. The research and development efforts provided a foundation for measuring improvements in work output and had several potential applications in assessing more cost-effective recruiting, selection, classification, and retention policies.

Training Performance

Beginning with initial military training at Lackland Air Force Base, the status of each airman's progress is tracked by the service for as long as that person remains on active duty. Data are input into the personnel records about how well each airman performs in Basic Military Training (BMT). Training completion has been used extensively in Air Force personnel studies tracking trends in the enlisted force including descriptions of the quality and performance of recruits admitted after implementation of the All Volunteer Force in 1973 (Wilbourn, Vitola, & Leisey, 1976). Disposition from BMT has also been examined to determine the effects of the Congressional initiative called Project 100,000 which admitted large numbers of low ability recruits into military service (Grunzke, Guinn, & Stauffer, 1970). The value of BMT performance and disposition variables is limited however. Covering only the first several weeks of military initiation, the measures are more suitable for training program administration evaluation than for assessing the performance of airmen for prediction studies and examining recruitment policies.

After completing BMT, most airmen proceed to technical training courses where they receive classroom instruction on work to be performed in their Air Force Specialty (AFS). Course lengths vary by difficulty of the performance requirements in each specialty and the amount of training that supervisors recommend be accomplished in a schoolhouse setting vice later when recruits are actually assigned to the job in a field setting. The Air Force maintains extensive records on airman performance in technical training. Measures include final course grades, pass/fail, and wash back rates. These measures, especially final course grades have been used extensively as criteria in prior studies of the validity of military selection and classification composites derived from the Armed Services Vocational Aptitude Battery (ASVAB). Air Force studies on technical training performance consistently have shown the predictive value of the Armed Forces Qualification Test (AFQT) for enlistment qualification and of the US Air Force Mechanical, Administration, General, and Electronic (MAGE) aptitude composites for job classification (Alley, Treat, & Black, 1988; Welsh, Kucinkas, & Curran, 1990; Welsh, Trent,

Nakasone, Fairbank, Kucinkas, & Sawin, 1990; Wilbourn, Valentine, & Ree, 1984). Training outcome measures are clearly a valuable criterion for assessing recruitment policies established to insure incoming recruits have the cognitive ability necessary to acquire requisite knowledge for military jobs (McCloy, Campbell, Knapp, Strickland, & DiFazio, 2006). A drawback is they are not a comprehensive indicator of incoming recruits' performance for their entire 4- or 6-year service commitment. The average length of an Air Force technical training course is less than three months.

Skill Upgrading

Enlisted personnel have a specified career path that includes achieving levels of increasing technical proficiency in an AFS. Airmen are awarded skill level upgrades based on completion of training requirements in formal technical schools, on the job, and through correspondence courses called Career Development Courses (CDC). A 1-level skill is used to designate an airman as untrained or unskilled during the time they are in basic training or technical school. After graduation from technical school, airmen are awarded a 3-level skill (apprentice). The 5-level skill (journeyman) is earned after a period of on-the-job training (OJT) at their duty assignment and completion of CDCs. Enlisted personnel are expected to attain journeyman status during their initial tour. The time required to earn a 5-level depends on the complexity of the job. The 7-level (craftsman) and 9-level (superintendent or manager) skills require additional training and attainment of non-commissioned officer (NCO) ranks. Each AFS has a Career Field Education and Training Plan (CFETP) that outlines career progression information, training requirements, and specialty training standards for mandatory task performance and knowledge requirements for each skill level.

Air Force personnel files record skill level changes and the date of the award of a skill level. The skill level is entered as the fourth character in the alphanumeric code used to identify each Air Force Specialty Code (AFSC). For example, 2S051 would identify a 5-level airman in the Supply Management specialty. Although the data are archived, skill upgrading information has not been widely used by researchers. The feasibility of manipulating the dates and codes to generate criteria for job performance prediction studies, however, was demonstrated by an effort which focused on group comparisons in a program evaluation (Skinner, 1983). The career progression of airmen who retrained into a new career field was compared to that of non-retrained airmen on number of months spent in 1-, 3-, and 5-level skills before upgrading to the next level. Dates and skill level codes in personnel records were used to generate the number of month variables for group comparisons between retrainees and non retrainees months-to-skill-upgrade.

Promotion

The enlisted force is comprised of airmen in nine grades/ranks (E-1 through E-9) corresponding to increased levels of training, education, technical competence, experience and managerial responsibilities. Several variables related to promotion decisions are maintained in the personnel files. These include date of promotion and grade achieved. In the lower ranks, promotion decisions consider time in service, time in grade/rank, and Enlisted Performance

Reports (EPR). The EPR is a supervisory evaluation of the performance of an enlisted member both on and off duty. The ratings have long been criticized as being inflated and analyses have shown their value for differentiating between low and high performing airmen is limited (Shore & Gould, 2004). Promotions in the lower ranks (E-1 through E-4) are usually made on a fully qualified basis. When promotion decisions occur, there is typically little variability in time spent in one rank before promotion to the next rank.

The Weighted Airman Promotion System (WAPS) factors for promotion to E-5, E-6, and E-7 include the Specialty Knowledge Test (SKT) and the Promotion Fitness Examination (PFE). These multiple-choice exams measure job-related knowledge determined by subject-matter experts to be appropriate for the grade being sought in the competition for promotion (Berkley, Breyer, Leahy, & Petrucci, 2002). The United States Air Force Supervisory Examination (USAFSE) an additional test factor for promotion to senior NCO grades E-8 and E-9.

The SKT, PFE, and USAFSE are not norm referenced tests. This is a major deficiency in terms of their potential utility as criteria for studies modeling job performance among the enlisted force. Test scores have comparable meaning only within promotion cycles. Moreover, the test scores are available only for enlisted personnel in second and subsequent tours of duty. The Air Force completed numerous studies of enlisted promotions for higher-ranked airmen during the development and several revalidations of WAPS and senior NCO systems. Airmen with higher test scores, time in grade, and time in service, as well as higher scores on several other factors, receive higher scores in the promotion systems (Shore & Gould, 2004).

The other Services have also conducted research using promotion-related measures. The Army used promotion rate as a variable during the joint-service job performance measurement project. The promotion rate measure was a deviation-score comparing each soldier's pay grade with the average pay grade having the same time in service within a Military Occupational Specialty (MOS) (Knapp & Campbell, 1993). In another study with Army soldiers, time-to-promotion to the junior grade (E-4) was found to relate to higher aptitude and high school completion. Age at time of entry was also a significant predictor (Ramsberger, Laurence, McCloy, & DiFazio, 1999).

Premature Attrition

Premature attrition from military service prior to completion of obligated commitments has been a central focus in guiding personnel selection decisions for many years. The common figure cited in the Air Force is that approximately 30% of incoming recruits do not complete their first enlistment for a myriad of reasons. These include fraudulent enlistments, failure to perform, physical and medical disability, disciplinary charges, alcoholism, financial irresponsibility, psychiatric reasons and other miscellaneous causes. Some researchers have tried to parse the reasons into pejorative versus non-pejorative categories, voluntary versus involuntary and desirable versus undesirable reasons (Laurence, Naughton, Harris, & Rumsey, 1996), with varying degrees of precision. Most observers agree that attrition is a multifaceted phenomenon with multiple precursors and with disposition reasons that sometimes belie the coding categories assigned in the Services' personnel files.

One certainty is that attrition is very costly in terms of lost recruiting and training investments and the need for replacement personnel to fill organization manning requirements. The General Accounting Office (GAO) estimated that the cost of attrition across services when calculated to include the costs of recruiting, training, maintaining and separating personnel, the compensation paid to separated military personnel in addition to lifetime veteran's benefits was in excess of billions of dollars annually (General Accounting Office, 1979, 1997, 2000).

Most attempts to predict and control the level of personnel losses have examined background precursors such as educational attainment, aptitude test performance, age at entry, demographic factors and other personal characteristics. The purpose has been to determine if one or another group was more prone to attrition so as to inform selection policy and guidelines.

Educational attainment defined in terms of high school disposition has frequently been found to be a relevant factor. (Buddin, 1988, 2005; Elster & Flyer, 1982; Flyer, 1963; Knapik, Jones, Hauret, Darakjy, & Piskator, 2004; Laurence, 1984, 1987; Smith & Kendall, 1980). High school graduates fare much better than non-high school graduates in their propensity to complete initial service commitments. Recruits with alternative credentials such as a GED and the home schooling certificates have attrition rates that are similar to the completion rates seen for non-high school graduates. The presumption drawn from these studies is that attainment of a high school diploma requires a degree of social maturity, perseverance, and a willingness to abide by guidelines established by the school system that are consistent with requirements for fulfilling a fixed term of military service.

The age-at-entry factor has been prominent in many attrition studies. The principal finding is that the youngest (17 years old) and oldest applicants (22 – 27 years of age) are more prone to early departure than applicants who are 19-21 years of age (Black & Fraker, 1984; Fischl & Blackwell, 2000; Flyer & Elster, 1983; Kantor & Guinn, 1975). Ostensibly, the younger recruits have not had time to focus on what they really want to achieve in military service while those who are considerably older may have had occupational adjustment problems already and may be looking for another career change.

Aptitude measures are commonly linked as precursors to early turnover in the military (Antel, Hosek & Peterson, 1987; Campbell & Zook, 1991; Clark, Krauss, Kelly, Onaitis, Li, Pototski, & Milaxxo, 1997; Fischl & Blackwell, 2000; Flyer, 1963; Flyer & Elster, 1983; Jackson, 1991; Klein & Martin, 1991; Talcott, Haddock, Kesges, Lando, & Fiedler, 1999; Zook, 1996). Recruits scoring higher on the Armed Forces Qualifying Test (AFQT) consistently serve longer than their less talented counterparts. The training demands imposed by the military services, especially in the more technical specialties, require higher levels of general cognitive abilities than some recruits possess leading many of the low scorers to attrite prematurely.

Findings on gender and racial/ethnic group membership, where these factors are related to attrition propensity, indicate that women attrit at slightly higher rates compared to men (Buddin, 2005; Ellis, 1999; Fischl & Blackwell, 2000; Flyer & Elster, 1983; Ross, Nogami & Eaton, 1984; Trent & Quenette, 1993; Zook, 1996;) although when pregnancy-related factors are controlled the retention rates are found to be more equivalent between the groups (Flyer & Elster, 1983; Ross, Nogami & Eaton, 1984). The effect of racial/ethnic status has been more

difficult to determine. Some studies found that Blacks as a group exhibited higher attrition than Whites (Flyer & Elster, 1983; Lockman, 1975). Other studies showed just the opposite – that Whites attrite at higher levels than Blacks (Fischl & Blackwell, 2000; Krauss, Hiebuhr, Trofimovich, Powers, & Yuanzhang, 2001; Matthews, 1977; Talcott, Haddock, Kesges, Lando & Fieldler, 1999; Trent & Quenette, 1992; Zook, 1996). Cook and Quester (1988) found racial/ethnic differences related to types of discharge. Blacks were more likely to have disciplinary actions than Whites but Whites were more prone to have administrative discharges as an alternative to courts-martial. There appear to be complicating factors where the size of racial differences may depend on what other determinants are being statistically controlled (Cooke & Quester, 1988; Klein & Martin, 1991).

Past studies have also looked at marital status, number of dependents, waiver status, and occupational category and found significant differences due to each of these factors. Typically married recruits show increased turnover especially those with dependents (Flyer & Elster, 1983; Klein & Martin, 1991; Mobley, Hand, Baker & Meglino, 1978; Smith & Kendall, 1980). Waivers in particular have come under scrutiny recently as the services attempt to fill their requirements with an expanding civilian economy and increased overseas military commitments. As one might expect, recruits entering with waivers granted for felony or serious misdemeanors are probably higher-risk than would normally be the case although definitive results to this point are lacking (Klein & Martin, 1991; Means, 1983). Attrition rates have also been found to differ by Air Force specialty, as have the reasons for attrition (Finsteun & Alley, 1983).

Since premature attrition directly affects the amount of productive service obtained from an enlistee, the concern over predicting and controlling this phenomenon will continue to influence personnel selection policy. Any improvement in reducing this type of turnover will enable higher return on recruiting and training investments and provide more useful service for those who remain longer in active duty status.

Qualified Man-Months

In a seminal paper prepared by the RAND Corporation for the U.S. Army, Fernandez, Bers, Schwarzbach, Moore and Cutler (1982) described their concept of Qualified Man-Months (QMM) which was defined as the number of months in service of persons scoring at the "qualified" level on a test of job skills. The QMM took into account first the probability the recruit would be in service in a given month and then the probability they would have obtained a qualifying score on a job proficiency test. These two joint probabilities were then accumulated across a given period of time to yield the QMM measure in months. With the use of aptitude and background information, the QMM was related to different types of entry-level personnel cohorts and the different expected QMMs noted. The philosophy behind the measure was attributed to earlier unpublished work done by Eugene Steadman Jr., Major, USAF, during his assignment at the Office of the Assistant Secretary of Defense (MRA&L) in the mid -1970s. The QMM measure was unique in several respects. It was widely available on Army recruits, could be related to the background of the recruits, catalogued their value and tenure with the service and could be aggregated to higher levels. It was meaningful then, not only for individual performance, but also to larger cohorts including force-wide views of productive months.

Differences in the amount of QMM available from recruits with varying high school credentials (graduate versus non-graduate), aptitude differentials on the AFQT (Categories I through IV) and special occupational composites (Combat Arms) derived from the ASVAB were noted, serving as a basis for an estimation procedure leading to a more refined recruiting and selection strategy.

Summary

Each of the individual performance criteria previously discussed has its own characteristic strengths and weaknesses for purposes of deriving a comprehensive productivity measure for use during the first term of enlistment. Some high fidelity methods such as hands-on measures are extraordinarily precise about the quality performance expected of incumbents but lack information about the quantity that might be expected. They are also quite expensive to develop and apply except on a non-recurring basis. Others such as training outcomes cover such brief time periods that their long term implications are difficult to fathom. Others are constructed and applied only within specialties, such as SKTs, making cross-specialty comparisons somewhat problematic. The SKTs also can only be accessed during second and subsequent tours of enlistment. Supervisory ratings have such restricted variance they are unusable as criterion measures. Qualified man-months comes closest to the intent of the measures we've envisioned but are applicable at present only to Army personnel taking skills tests during the first term. That leaves for active consideration the criteria of attrition and skill upgrade as potential measurement constructs that might be combined into a robust individual measure-of-merit. Attrition reflects longevity of service and skill upgrading depicts transitions from apprentice to journeyman qualification levels. What we are seeking is a comprehensive metric that is applicable to the entire Air Force. The metric should be easily and inexpensively derived from archival data and be relevant across all specialties and across time. Ideally it might also be appropriate for aggregation to higher levels of analysis beyond the individual recruit i.e., specialties, entry year cohorts, work centers and force-wide accumulations. The measure however constructed should have applicability for fine tuning entrance standards as well as showing sensitivity to manpower analyses, cost-benefit tradeoffs, and force planning where the effects manpower and personnel initiatives can be systematically tracked over time to determine if the expected performance gains outweigh investments in programmatic change initiatives.

III. OBJECTIVES

The purpose of the current study was to develop a measure of job performance reflecting an individual airman's contribution to the mission readiness of the Air Force during their first four years of service. The qualified man-months concept developed by RAND was the inspiration for much of the design of this work (Armor, Fernandez, Bers, Schwarzbach, Moore, & Cutler, 1982; Fernandez & Garfinkle, 1984). The goal was to extend the qualified man-months measure employed for Army soldiers by capitalizing on information maintained on airmen in Air Force personnel files. The archival method for obtaining job performance measures was chosen for practicality and cost-effectiveness. A principal goal was to create a simple but robust methodology for job performance measurement that was sensitive to individual aptitude and background factors available at time of entry.

The variables of primary interest were those that are routinely entered into the personnel system files for all airmen. The approach was to explore novel methods for combining information about skill acquisition and longevity of service to produce a composite measure of individual job performance that would support comparisons across specialties and across time. The candidate performance measures needed to be feasible to develop, replicable, and sensitive to entrant aptitude quality. Another critical feature was the suitability of the measures for aggregation across the total enlisted force to yield a system-wide indicator of productivity or mission readiness. Then we were interested in the extent to which the productivity measures were related to measured characteristics of entering recruits and the possible benefits of using this information to improve the selection and classification process.

The study was designed to be accomplished in three phases. In the first phase, a conceptual model was developed and candidate measures reflecting airman productivity in the first term were defined. In the second phase, the predictability of the criterion measures by scores on the ASVAB and other recruit quality and background factors were examined. The prediction models were developed to determine the relationship between measures obtained during the enlistment process and subsequent productivity in the service. The analyses were essential for demonstrating the sensitivity of the measures for distinguishing meaningful differences in airman performance. The third phase was a demonstration of the utility of the measures for addressing alternate selection and classification policies through optimization of enlistee assignments in the study sample.

IV. APPROACH

Criterion Development

Concept of job performance measurement. The conceptual approach was to capture the productivity of Air Force enlisted personnel during their first four years of service. This approach was a variation on the method used by RAND Corporation for Army soldiers (Armor, Fernandez, Bers, Schwarzbach, Moore, & Cutler, 1982; Fernandez & Garfinkle, 1984). In the Air Force, most entrants successfully complete their first tour of duty (defined as 4 years for this study) as illustrated in Figure 1. About 30 percent attrite prematurely before reaching the 4-year point.

During the initial tour, airmen engage in training for upgrading their job skills from helper (1-level) to apprentice (3-level) to journeyman (5-level). At the completion of initial technical training for individual Air Force specialties, airmen are awarded a 3-level skill and are awarded the apprentice designation. With further on-the-job training in actual job settings and with study through correspondence courses, airmen complete skill upgrading tests beginning in their second year of service to qualify for 5-level journeyman status. About 85 percent of airmen in service at the end of four years have attained journeyman status and are fully qualified with mission-ready capabilities. Progression to the 7-skill level (Craftsman) and 9-skill level (Superintendent) occurs in later tours for airmen who reenlist.

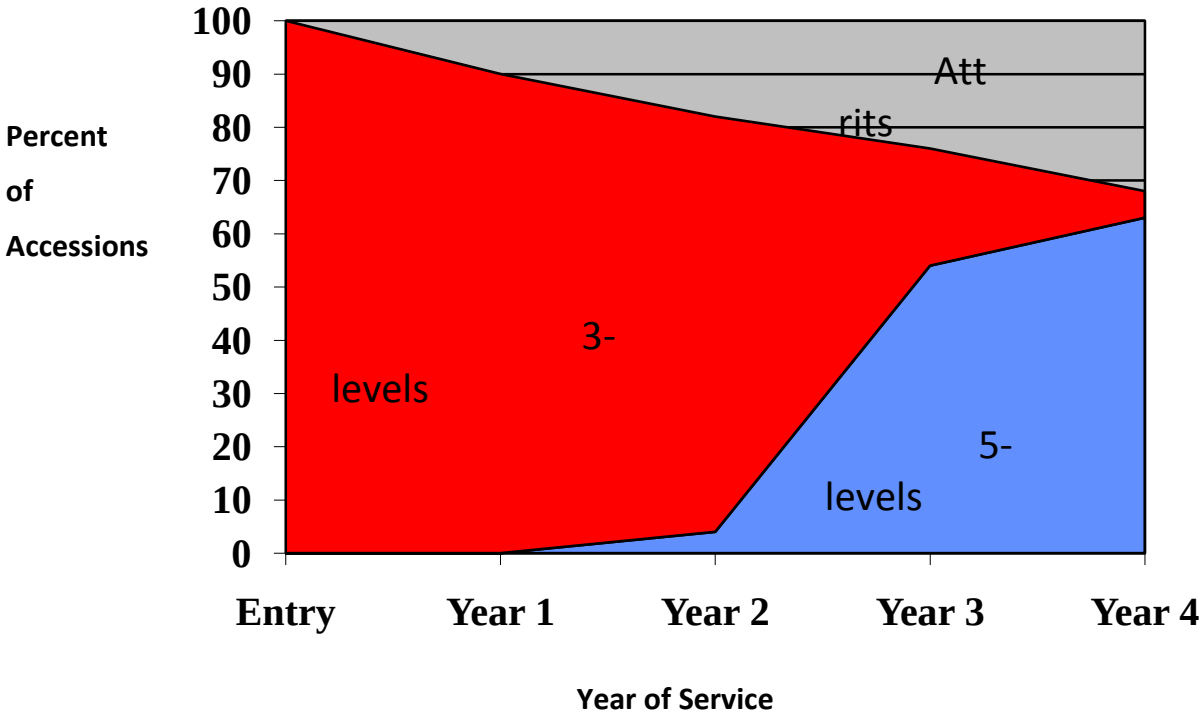


Figure 1. Performance Criterion Space.

The RAND Corporation's definition of productivity was to note the number of months of qualified service soldiers provided over a fixed period of time. This measure is conceptually analogous to the amount of service in the 5-skill level for Air Force enlisted personnel. In this study we explored several measures of service length, the first of which was a simple accounting of length of service from time of entry to either time of premature discharge or completion of the first four years. A second indicator was the number of months spent in the 5-skill level. In preparation for generating a third indicator of job performance, we calculated the number of months in the 3-skill level by subtracting number of months in the 5-skill level from total months served to a maximum of 48 months. Then, a composite measure was formulated to account for the fact that airmen serving in the 3-level provide a certain amount of productive service while in apprentice training status. The value in relation to fully productive 5-level service was judged to be .5 for purposes of criterion measurement. Productive service was defined as a combination of fully weighted 5-level service with partially weighted 3-level service. The composite measure was called months of mission-ready service (MM-RS).

Estimation of the criterion measures. The predictability of the job performance measures based on airman aptitude, background, occupational category, and enlistment status was examined with two primary estimation methods. The procedure used by RAND Corporation, which employed logistic regression models developed separately for each of 16 quarters in the first four years of service, was replicated. Within each quarter we generated two logistic regression probabilities, the first of which was the probability of being in or out of service in that quarter. The second probability, given that the entrant was in service in the given quarter,

represented the probability that the airman achieved the 5-skill level. To obtain an overall measure of productive service in the four year period, the probability values were aggregated across quarters to derive a measure of total months of service and total months of 5-level service.

The second estimation method was a multiple regression approach using dependent measures of total months of service and total months of 5-level service. Compared to the logistic regression approach, the linear regression approach is less complex and there are many fewer parameters to estimate ($1/16^{th}$ as many), assuming that the alternative regression method provided a comparable level of predictive accuracy. Comparisons of the predictive accuracy of logistic regression and multiple linear regression models were planned to determine the analytic approach that would be used in later phases of the study.

Sample Selection

The total sample was constructed by identifying 24 enlisted specialties for the study. High-flow Air Force specialties (AFSs) with relatively large numbers of accessions yearly were needed to insure a large total sample, as well as adequate sample sizes for within-specialty analyses planned for study. Consideration was given to coverage of the Mechanical (M), Administrative (A), General (G), and Electronic (E) job families used to characterize the type of work predominately performed in Air Force jobs. A total of six AFSs were identified from each of the four aptitude areas. A final consideration was the minimum aptitude requirements for job entry on the ASVAB. Aptitude requirements were addressed in sample selection by categorizing minimum entry requirements as high, medium, and low aptitude.

Data Sources and Data Base Development

Database development for the study was accomplished as part of the Human Resources Research Databank (HRRD) project, an ongoing contractual effort being performed by Operational Technologies Corporation for HQ AFPC/DPST.

The data sources were files maintained by the Headquarters Air Force Personnel Center (HQ AFPC) on non-prior service enlisted personnel. The files were used to identify accessions assigned to each of 24 selected specialties for three consecutive years – 2000, 2001, and 2002. The file extraction process resulted in a total sample of 24,381 entrants. Each entrant was tracked forward for four consecutive years or 16 quarters of service by successive matches with HQ AFPC files through 2006. In this manner, airmen entering service in year 2000 were tracked through 2004, the 2001 entrants through 2005, and the 2002 entrants through 2006. Multiple file matches and data merges were used to extract basic variables on each entrant needed to generate job performance criteria and predictor variables for analysis phases of the study (Appendix A).

The 5-character Air Force Specialty Code (AFSC) and title for the 24 specialties in the total sample are shown in Table 1. The primary aptitude area requirement (M, A, G, E) and minimum percentile score for entry are also given. The number of airmen assigned to each specialty ranged from 181 in the Space Systems Operations (1C6X1) specialty to 7,770 in the Security Forces (3P0X1) specialty. Seven specialties had case counts greater than 1,000. Most specialties (18 of 24) had counts that exceeded 400 cases. The specialties with case counts less

than 400 airman entrants were Aviation Resource Management (1C0X2; N = 354), Radio Communication Systems (3C1X1, N = 218), Airfield Management (1C7X1, N = 184), Airborne Cryptologic Linguist (1A8X1, N = 238), Space Systems Operations (1C6X1, N = 181), and Missile and Space Facilities (2M0X3, N = 184).

Table 1. Sample Description (Total N = 24,381)

AFS Code	Title	Primary Aptitude Requirement	No. of Cases
3E0X2	Electrical Power Production	M56	526
2A6X6	Aircraft Electrical & Environmental System	M41	1120
2A6X3	Aircrew Egress Systems	M56	401
2T0X1	Traffic Management	A35	524
3A0X1	Information Management	A28	1946
3S0X1	Personnel	A41	1280
3C0X1	Communications-Computer Systems Operator	G64	1875
3M0X1	Services	G24	1115
6F0X1	Financial Management & Comptroller	G57	452
3C2X1	Communications-Computer Systems Control	E70	545
3E0X1	Electrical (Civil Engineering)	E28	476
2E6X3	Voice Network Systems	E45	288
2T1X1	Vehicle Operations	M40	697
1C1X1	Air Traffic Control	M55	299
2W0X1	Munitions Systems	M60	2040
1C0X2	Aviation Resource Management	A41	354
3C1X1	Radio Communication Systems	A41	218
1C7X1	Airfield Management	A41	184
3P0X1	Security Forces	G33	7770
1N0X1	Operations Intelligence	G57	499
1A8X1	Airborne Cryptologic Linguist	G72	238
1C6X1	Space Systems Operations	E60	181

2A3X2	F-16, F-117, RQ-1, CV-22 Avionic Systems	E70	499
2M0X3	Missile & Space Facilities	E50	184

Aptitude and Background Predictors

Predictors were identified from those that traditionally have been shown to be related to airman performance and attrition. These were aptitude, age, education, gender, and race/ethnicity. Also identified were several key variables that have not been widely used in prior studies but which were judged as potentially important for addressing the impact of recruiting policies on job performance. These were the extent to which an airman qualified relative to the selector AI accession category, waiver status, and AFS assigned. Descriptive statistics for the aptitude and background predictor variables are shown in Tables 2 and 3.

Table 2. Descriptive Statistics for ASVAB Subtests (N = 24,381)

Subtest	Mean	Std Deviation	Minimum	Maximum
GS	52.27	7.10	23.00	73.00
AR	52.24	6.87	32.00	70.00
WK	52.68	4.84	24.00	68.00
PC	53.48	5.33	27.00	67.00
AS	46.83	7.92	24.00	70.00
MK	55.64	6.37	33.00	69.00
MC	51.27	8.60	23.00	73.00
EI	49.13	7.74	22.00	72.00

Airman aptitude was represented by scores on the eight ASVAB subtests listed in Table 2. Level of aptitude was reported in the metric of standard scores, which in the ASVAB normative reference group, have a mean of 50 points and a standard deviation of 10 points. The airmen in the total sample had scores about 1 to 5 points higher on average than examinees in the reference group on six of the eight ASVAB subtests (see Table 2). On the Auto and Shop Information subtest and the Electronics Information subtest the sample means were below those for the normative sample.

Another major category of aptitude predictor captured information about each airman's aptitude relative to the minimum entry requirement or Selector AI for the AFS in which they were classified. Table 1 shows the minimum aptitude requirement for each of the 24 AFSs in the study. Scores obtained by airmen on the designated Air Force classification composite (Mechanical, Administrative, General, Electronic) were compared to the entry score requirement

and used to determine the airman's status on the Selector AI predictor category. As shown in Table 3, nearly 92 percent of the airmen met or exceeded aptitude minimums for AFS entry. About 40 percent of the airmen scored 20 percentile points or more above the standard, 25 percent scored 10 to 19 points above, and 28 percent met the minimum standard or exceeded it by up to 9 percentile points.

Table 3. Background and Demographic Variables (N = 24,381)

Variable	N	% of Sample
Selector AI		
0 to 9 percentile points above selector AI	6834	28.0
10 to 19 percentile points above	6134	25.2
20 percentile points or more above	9512	39.0
Below the selector AI	1901	7.8
Gender		
Male	17434	71.5
Female	6947	28.5
Race/Ethnicity		
Unknown	1163	4.8
Black	7408	30.4
White	12067	49.5
Hispanic	1285	5.3
Other/Mixed	2458	10.1
Education Level		
Unknown	6254	25.7
Less than high school	154	0.6
Alternate certification	337	1.4
High school diploma	15766	64.7
High school +	1870	7.7
Age at Entry (years)		
17 - 18	10410	42.7
19 - 20	8932	36.6
21 - 22	3075	12.6
23 - 24	1185	4.9
25 - 26	532	2.2
27 and older	247	1.0
Accession Category		
4-year open assignment, no bonus	3458	14.2
4-year Guaranteed. assignment, no bonus	5878	24.1
4-year Guaranteed assignment, with bonus	2503	10.3
6-year Guaranteed, Acc. promotions, no bonus	910	3.7
6-year Guaranteed, Acc. promotions, with bonus	11050	45.3
Unknown	582	2.4

Waiver Status		
None	22676	93.0
Felony	64	0.3
Serious misdemeanor	217	0.9
Minor misdemeanor	699	2.9
Other waiver	725	3.0

Descriptive statistics for background and demographic characteristics (see Table 3) revealed that the sample was composed predominately of airmen who were male (72 percent). Most airmen reported their race/ethnicity as White (50 percent). The majority had a high school diploma (65 percent). Educational level was not known for a substantial proportion of the sample (26 percent). Later analyses suggested that airmen in the unknown category performed at levels consistent with airmen in the high school + category who had earned college credits or an undergraduate degree. Consequently, it is possible that more than 7 percent of the sample would have been in the high school + category if complete educational level data had been available on Air Force personnel files. Most airmen entered service when they were 17 or 18 years old (43 percent). Less than 10 percent were older than 24 years of age upon entry into the Air Force.

The Air Force Recruiting Service administers several types of enlistment programs that differ in terms of length of enlistment contract, type of pre-enlistment job assignment, and kind of enlistment incentives. Options for length of service commitments used in the study were 4 or 6 years. Some recruits are offered a guaranteed assignment to a specific AFS prior to enlistment. Other airmen are recruited into one of the four Air Force aptitude index (AI) areas (Mechanical, Administrative, General, or Electronic). Recruits who enter with an open assignment are classified into a specific AFS as they near completion of Basic Military Training. Other recruiting programs offer a monetary bonus and/or accelerated promotion incentive for enlisting in selected AFSs. For this study airmen were coded in one of six accession categories (see Table 3), including an unknown category. The accession category for about 2 percent of the airmen could not be determined from Air Force personnel files. Most airmen were recruited with a 6-year commitment in a Guaranteed AFS with Accelerated promotion and bonus incentives (45 percent).

Most recruits entering the Air Force meet all moral, aptitude, physical and other types of entry standards. Approximately 93 percent of the airmen in the study sample entered without waivers of any standards. About 4 percent of the airmen were categorized by severity of moral waivers (felony, serious misdemeanor, minor misdemeanor). Airmen with other types of waivers (3 percent) were combined in a single category which included those who failed to meet various age, aptitude, strength/stamina, or other requirements.

The final data base had nine major categories of predictors for estimation analyses: aptitude, gender, race/ethnicity, education level, age at entry, accession category, waiver status, selector AI, and assigned AFS. With the exception of the eight ASVAB measures of aptitude using standard scores, the predictor variables were treated in the analyses as categorical variables. Binary coding was used to identify airmen who were (code 1) or were not (code 0) in each subgroup within each predictor category. The coding structure described was used in all

analyses, including comparisons of the predictive accuracy of logistic regression and multiple regression methods and of the relative effectiveness of the different categories of predictors.

Analyses of Classification Benefits (Within-Specialty Analyses)

A final series of analyses addressed classification benefits that might accrue if estimates of the performance criteria were obtained and applied on a specialty-by-specialty basis. In this demonstration separate estimation equations based on the aptitude and background predictors were generated and used in a mathematical optimization. Recruits in each of the 24 specialties were "re-assigned" based on their expected performance in order to maximize the overall gain to the classification system while meeting job quota requirements for all 24 specialties. This assignment optimization was modeled as a transportation problem using commercially-available linear programming software.

Four scenarios were conducted and compared: 1) a maximized MM-RS solution, 2) a random solution simulating reassignments of airmen to specialties without prior estimates of their performance, 3) the actual or observed solution obtained with the analysis sample, and 4) a minimized MM-RS solution. Follow-on analyses were conducted to reveal how each of the specialties changed from pre- to post-optimal assignment. Finally, an additional series optimization analyses was conducted to simulate how increasing selectivity during the personnel acquisition process could lead to system-wide benefits in personnel capabilities.

V. RESULTS AND DISCUSSION

Performance Measures

The first series of analyses addressed the characteristics of performance measures developed to reflect the longevity and skill level attained by airmen. Descriptive data for Total Months of Service and Months of 5-Skill Level Service criteria are shown in Table 4. The average number of Total Months of Service was 38.8 across all recruits with a range of 0 to 48 months. Months of 5-level service ranged from 0 to 28 months with a mean of 9.6 months. The composite measure Months of Mission-Ready Service (MM-RS) that represented all the 5-level months and half-weighted 3-level months averaged 24.2 months for each recruit with a range of 0 to 38 months. The mean value indicates that an average recruit has a work capacity considered to be "mission ready" for approximately 50% of the first 48-month period of his/her enlisted service.

Table 4. Descriptive Statistics for Performance Measures (N = 24,381)

Performance Measures	Mean	Standard Deviation	Range
Total Months of Service (TMS)	38.8	15.2	0 – 48

Months of 5-Level Service (5MS)	9.6	8.9	0 – 28*
Months of Mission-Ready Service (MM-RS)	24.2	11.0	0 – 38*

* Effective range.

The variability of MM-RS, as indicated by the standard deviation of 11 months and the 0 to 38 month range, shows that some individual recruits provide very few mission-ready months while others provide a great many more. About 68 percent of the recruits fall within 24.2 months $\pm$ 11 months which is about 12.2 months at the lower range and 35.2 months at the higher range.

An interesting and useful aspect of using time in service as a dependent measure is that months served at a given skill level can be aggregated across individual recruits in a cohort. For example, if 100 average recruits are tracked across a 48-month period, their service commitments would be 4,800 months of service (100 X 48) of which 2,400 months would be considered mission-ready. If a similar group of 100 recruits could be selected or assigned such that their expected MM-RS was increased from 24 months to 26 months, then their total mission-ready service could be raised to 2,600 months out of a 48-month period or an increase of 8 percent effective service time. For recruits assigned to aircraft maintenance specialties, the increase would be expected to translate into higher capacity for generating sorties in a given period of time.

Estimating the Performance Measures

The purpose of the next series of analyses was to determine how well the logistic regression approach worked in estimating the performance measures and whether the multiple linear regression technique would suffice as a simpler alternative. The logistic model had 928 parameters (16 quarters x 58 independent predictors in the full model) compared to the 58 parameters in the simplified multiple regression model which combined information across all quarters. In evaluating the complex logistic regression approach where separate probability estimates were generated for each of the16 quarters of military service, we found little to be gained in terms of prediction accuracy or ease of interpretation for the more complex logistic procedure. Multiple correlation coefficients (R) obtained for the full model for the two estimation procedures using both the Total Months of Service and Total Months of 5-level Service as criterion measures are shown in Table 5. The R values in the estimation of the total months criterion were slightly higher for the logistic regression procedure but the gain was not judged to be appreciable. The R values for the two performance estimation procedures differed by .044 and .002 for the Total Months of Service criterion and Total Months of 5-level Service criteria, respectively.

These results supported a decision to proceed with further analysis using the multiple linear regression approach only. Subsequent analyses also focused on the composite MM-RS criterion. The MM-RS criterion was well predicted by airman characteristics in the full model ($R = .47$) as shown in Table 5. The source table for the full results (Table 6) provides additional information on the accuracy and statistical significance ($p < .0001$) of the overall model for predicting MM-RS as a measure of job performance.

The next series of analyses were conducted to determine whether the major categories of aptitude and background variables made a significant and unique contribution to the prediction of MM-RS. The source column in Table 7 identifies the nine major categories of predictors that were tested. As discussed previously in the report and shown in Table 7, the full model containing all nine predictor categories had a R^2 value of .2194. Restricted models were constructed which removed the effects of each designated category of predictor variables. The resulting R^2 values for each restricted model are shown in the third column.

Table 5. Multiple Correlations for Full Prediction Model

Criterion	Multiple Regression	Logistic Regression
Total Months of Service	.495	.539
Months of 5-level Service	.361	.363
Months of Mission-Ready Service	.470	N/A

Table 6. Source Table of Full Model Statistics for Estimation of MM-RS

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F	Multiple R
Model	57	647032	11351	119.95	< .0001	.47
Error	24323	2301712	95			
Corrected Total	24380	2948744				

Table 7. Source Table for Prediction of MM-RS by Aptitude and Background Variables

Source	R^2 Full	R^2 Restricted	df_1	df_2	F
Aptitude Score	.2194	.2073	8	24,323	47.27**
Selector AI	.2194	.2189	3	24,323	5.21**
Gender	.2194	.2172	1	24,323	68.75**
Race	.2194	.0770	4	24,323	1,112.50**
Education	.2194	.2154	4	24,323	31.25**

Age	.2194	.2167	5	24,323	16.88**
Accession Category	.2194	.2103	5	24,323	56.88**
Waiver Status	.2194	.2184	4	24,323	7.81**
AFS	.2194	.1907	23	24,323	38.99**

A total of nine comparisons of the full and each restricted model were then conducted using the F-statistic in tests of significance. To illustrate the results, as shown in the first row of Table 7, the R^2 after removing aptitude effects (eight ASVAB subtests) was .2073. Comparison of the R^2 values for the full and restricted model yielded an F-statistic of 47.27 with 8 and 24,323 degrees of freedom ($p < .01$). All nine comparisons were statistically significant revealing that all categories of airman aptitude and background variables contributed uniquely to the prediction of MM-RS, while controlling for the effects of the remaining categories. The largest decrease in R^2 was the result of removing race or AFS assigned from the model, followed by gender, accession category and aptitude.

Parameters of each predictor in the full model are summarized in Table 8. The b-weights, standard error, and t-value for each parameter are presented. These tabular results are augmented with graphical displays (Figures 2 through 10) to depict the magnitude and direction of effects for subgroups within each predictor category. In these graphs, the differences in expected MM-RS was shown holding constant the effects of the other variables at a mid-range value. In other words, if we were to find average people who had similar aptitude and background characteristics but differed by only in the designated factors, the differences in MM-RS between them would be the amount as shown in the graphic display.

Table 8. Linear Regression Results for Full Model Predicting MM-RS

Parameter	Estimate	Std. Error	t Value	Parameter	Estimate	Std. Error	t Value
Intercept	27.41	1.60	17.16	4y Guar, Bonus	0.96	0.46	2.09
General Science	-0.04	0.01	-3.33	6y Guar, AP, NoB.	2.80	0.53	5.32
Arith. Reasoning	-0.09	0.01	-6.48	6y Gua, AP, Bonus	3.29	0.42	7.75
Word Knowledge	-0.14	0.02	-7.54	Unknown Enl Cat	0.00		
Paragraph Compre.	0.05	0.01	3.44	No Waiver	1.41	0.37	3.76
Auto & Shop Info.	-0.10	0.01	-8.00	Felony Waiver	-0.54	1.27	-0.43
Math Knowledge	0.14	0.01	10.84	Serious misdem.	-1.23	0.76	-1.62
Mechanical Comp.	-0.03	0.01	-2.52	Minor misdem.	0.80	0.52	1.53
Electronic Info.	0.01	0.01	1.09	Other Waiver	0.00		
0-9 pts. above SAI	0.04	0.26	0.17	AFSC 3E0X2	-7.91	0.76	-10.45

10-19 pts. above SAI	0.57	0.28	2.00	AFSC 2A6X6	-1.02	0.49	-2.10
20+ pts. above SAI	1.00	0.33	3.00	AFSC 2A6X3	-2.47	0.50	-4.94
Below the SAI	0.00			AFSC 2T0X1	-0.34	0.45	-0.76
Gender Male	1.41	0.17	8.42	AFSC 3A0X1	0.34	0.56	0.61
Gender Female	0.00			AFSC 3S0X1	-0.13	0.44	-0.31
Race Unknown	10.73	0.35	30.84	AFSC 3C0X1	0.16	0.61	0.27
Race Black	1.37	0.23	6.02	AFSC 3M0X1	0.87	0.49	1.77
Race White	10.14	0.22	45.09	AFSC 6F0X1	0.19	0.36	0.52
Race Hispanic	10.15	0.34	30.18	AFSC 3C2X1	0.43	0.47	0.92
Race Mixed/Other	0.00			AFSC 3E0X1	-1.87	0.36	-5.13
Ed Lev Unknown	0.35	0.28	1.27	AFSC 2E6X3	0.14	0.57	0.25
Less than High Sch	-3.40	0.82	-4.13	AFSC 2T1X1	-0.65	0.58	-1.11
Alternate Certifica.	-4.47	0.59	-7.59	AFSC 1C1X1	-1.47	0.52	-2.83
Parameter	**Estimate**	**Std. Error**	**t Value**	**Parameter**	**Estimate**	**Std. Error**	**t Value**
High Sch Diploma	-0.75	0.26	-2.94	AFSC 2W0X1	0.17	0.64	0.26
High School +	0.00			AFSC 1C0X2	0.69	0.57	1.22
Age 17-18 years	-3.34	0.64	-5.22	AFSC 3C1X1	0.02	0.70	0.03
Age 19-20 years	-3.12	0.64	-4.90	AFSC 1C7X1	1.83	0.76	2.43
Age 21-22 years	-2.13	0.65	-3.28	AFSC 3P0X1	-4.17	0.30	-14.09
Age 23-24 years	-1.58	0.68	-2.13	AFSC 1N0X1	-0.30	0.56	-0.53
Age 25-26 years	-1.04	0.75	-1.39	AFSC 1A8X1	-1.83	0.78	-2.34
Age 27 and older	0.00			AFSC 2M0X3	-1.18	0.80	-1.47
4y Open, No bonus	1.09	0.45	2.42	AFSC 1C6X1	-2.52	0.60	-4.18
4y Guar, No bonus	0.83	0.43	1.95	AFSC 2A3X2	0.00		

Aptitude measures. The relationship between the eight ASVAB subtests and MM-RS presented mixed results; only three of the eight subtests (Math Knowledge, Paragraph Comprehension, and to a lesser extent Electronics Information) had positive regression weights. Only for these subtests were higher scores consistent with higher levels of productivity. The remaining five subtests had negative regression weights. The findings implied that an institutional selection system based on the relationships would first have to address the problem negative test predictors. Selection systems with negative weights are impractical and thus, inherently self-defeating, because applicants who purposely score low on a negatively-weighted test increase their prospects for selection.

Additional analyses were conducted on the aptitude predictor category to address the issue of negative weights. We used the eight ASVAB subtests as a unique set of predictors in a separate regression model. This model had a multiple R of .158 ($p. < .01$) with both positive and negative weights on individual subtests. The results were used to construct a unit-weighted aptitude composite consisting only of positively weighted subtests. The resulting composite was PC + 4MK + 2AS + EI. When regressed on MM-RS, the composite achieved a validity of .151 versus .158 for the full set of eight ASVAB subtests.

The composite could be used as an auxiliary screening measure to improve prediction of MM-RS in conjunction with the Armed Forces Qualification Test (AFQT), the primary military measure derived from the ASVAB. The AFQT score had a zero-order correlation of .11 with MM-RS.

Expected MM-RS values for three levels of the aptitude composite are plotted in Figure 2. The three levels are one standard deviation below the mean (-1SD), the mean score on the composite, and one standard deviation above the mean (+1SD). Recruits with aptitude scores that are 1 SD below the mean would be expected to provide 3.3 fewer months of mission-ready service than Air Force than recruits with scores 1 SD above the mean.

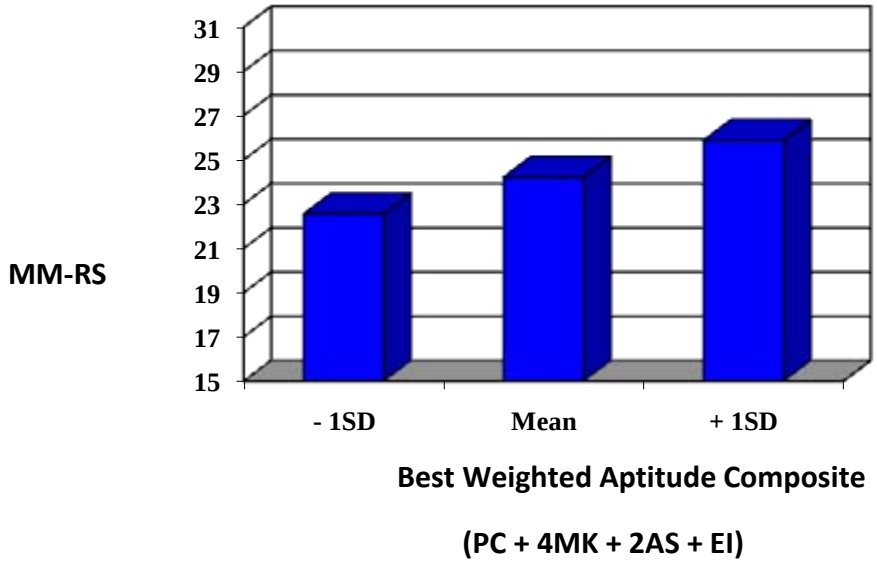


Figure 2. Expected Values of MM-RS for Best Weighted Aptitude Composite.

Although the effect of the aptitude predictor category was statistically significant, the magnitude of differences between subgroups was found to be modest but still appreciable, particularly when the aptitude measures are configured into a best-weighted composite. In this and later sections of the report where the effects of demographic and background predictor categories are discussed, the effect sizes ranged from 1½ months to more than 10 months. Since 2½ months of MM-RS represents approximately 10 percent of a recruit's effective contribution during the first term, we adopted 2 to 2½ months as a practical threshold for meaningful differences among subgroups. Thus, the difference of 3.3 months of mission-service between

lower (- 1SD) and higher scoring recruits (+ 1SD) exceeds the *a priori* decision rule for practical significance.

Selector AI. The effects of recruits' ASVAB scores relative to the Selector AI for his/her AFS are shown in Figure 3. There were small but regular differences in MM-RS between the qualification subgroups. Under-qualified personnel provided the lowest amount of mission-ready service and the most over-qualified personnel had the highest expected level of mission-ready service. The difference between the under-qualified and most over-qualified subgroups was about one MM-RS, an effect that was below the threshold of practical consequence.

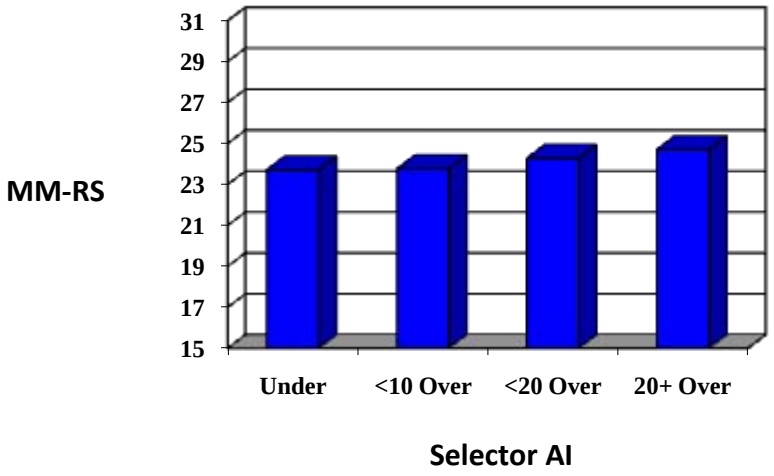


Figure 3. Expected Values of MM-RS for Selector AI Predictor Subgroups.

Gender. The study revealed small differences between males and females in expected MM-RS (Figure 4). Males had slightly higher (1.4 months) MM-RS values. Although gender was a significant predictor, the magnitude of differences between the subgroups did not reach the level of a practical difference. The observed difference is consistent with previous findings in the military attrition literature that found females are less likely to continue in service because of slightly higher attrition rates relative to men.

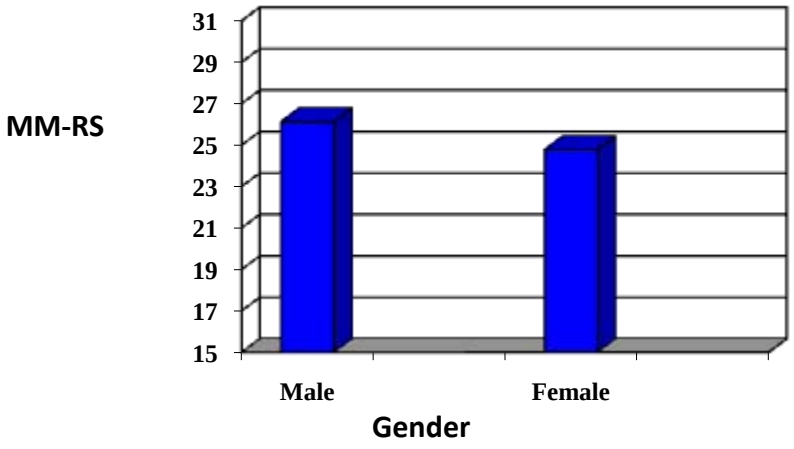


Figure 4. Expected Values of MM-RS for Gender Subgroups.

Race/Ethnicity. Large differences in MM-RS were found for racial/ethnic subgroups (Figure 5). Blacks and Mixed/Other subgroups provided on average about 10 fewer months of productive service than White (Non-Hispanic) and Hispanic subgroups. The effect of race was moderated, as will be shown later in the report, based on the AFS of initial assignment. The overall 10-month difference was observed in particular AFS assignments but not in others. The racial/ethnic disparity was observed while the other variables were statistically controlled which may account for why the effect of this factor has been somewhat equivocal in the literature.

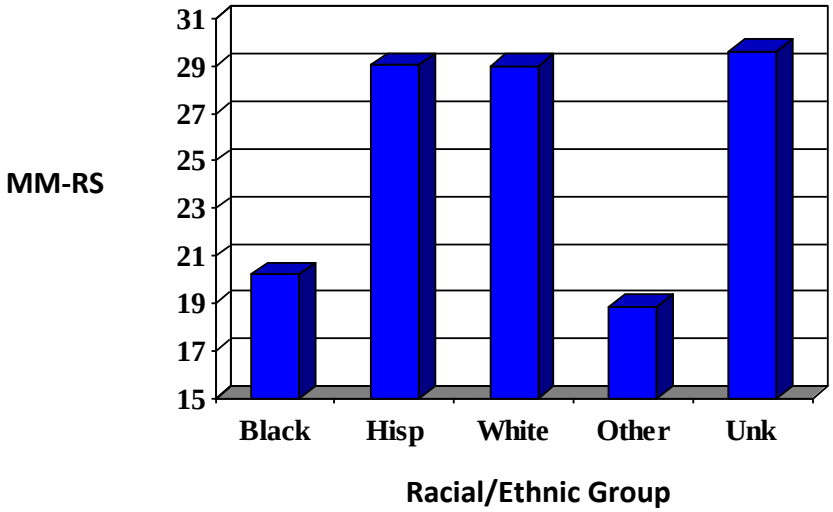
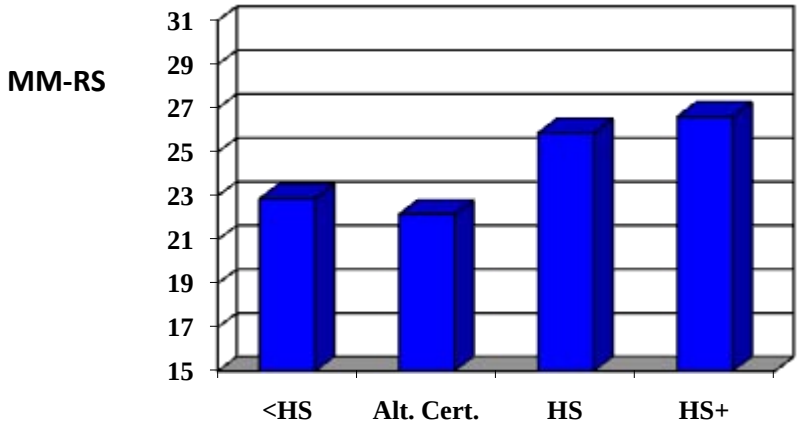


Figure 5. Expected Values of MM-RS for Racial/Ethnic Subgroups.

Education. Education effects shown in Figure 6 indicate overall differences of about 4.5 months. Recruits with less than a high school education or alternative certification (primarily GEDs) had lower expected MM-RS than those with a high school diploma or with a diploma and some college credits. The effect of education on MM-RS was consistent with findings in the literatures on attrition.



Education Level

Figure 6. Expected Values of MM-RS for Education Level Subgroups.

Age at Entry. The relationship found between age and MM-RS was approximately linear as shown in Figure 7. Younger enlistees provided the least amount of productive service. Each additional age subgroup yielded slightly more service up to the highest age subgroup. Previous studies of attrition noted a bimodal trend in age with the youngest and oldest recruits showing the least propensity to remain in service wherein persons in the 19-23 year old groups characteristically stayed the longest. This was not the case in the present study where the older the applicant, the higher the expected number of MM-RS.

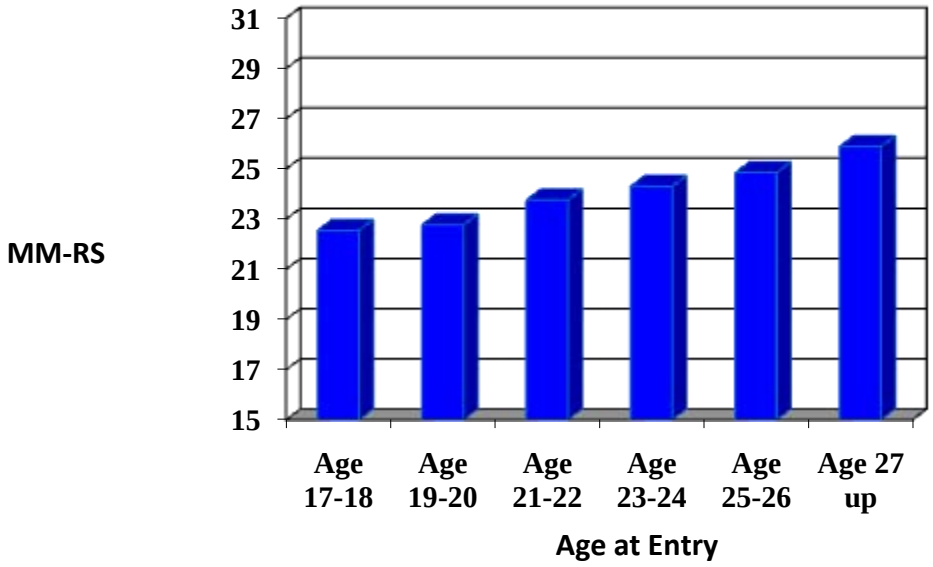


Figure 7. Expected Values of MM-RS for Age at Entry Subgroups.

Accession category. Comparisons of recruits in different accession category subgroups are shown in Figure 8. The 6-year enlistees provided an additional 1.5 to 2 MM-RS compared to 4-year enlistees. There were slight increases in expected MM-RS due to bonus incentives in the 6-year subgroups but the effect was not evident in the 4-year subgroups. It should be noted that recruits in the 6-year subgroups were eligible for accelerated promotions that were not available for shorter term enlistments.

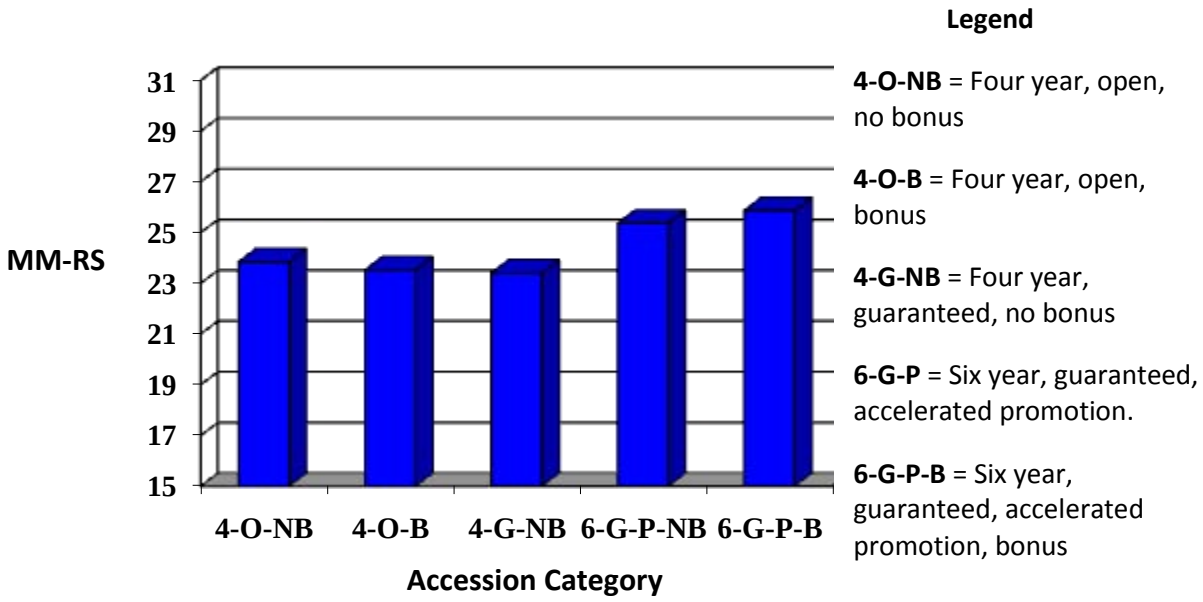


Figure 8. Expected Values of MM-RS for Accession Category Subgroups.

Waiver status. Results from comparisons among waiver categories (Figure 9) showed that enlistees with serious misdemeanor and felony convictions in their backgrounds served 2 to 2½ fewer months in mission-ready status than did recruits with no waiver or those with minor misdemeanor convictions. Intermediate between these two subgroups was the expected MM-RS for recruits in the "Other" waiver subgroup. This finding was generally consistent with previous literature.

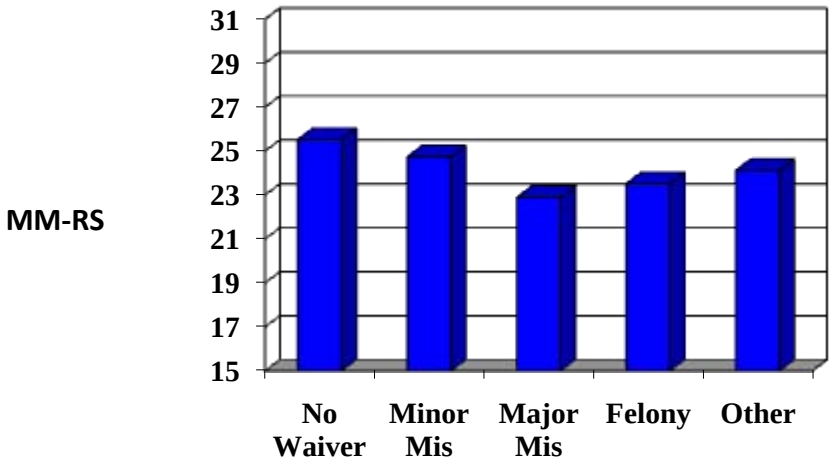


Figure 9. Expected Values of MM Waiver Status us Subgroups.

AF Specialty. The average expected MM-RS for the six of 24 specialties in the study with the most and least amount of productive service is shown in Figure 10. The range of differences was about 9.7 months with the least amount of mission-ready service provided by enlisted personnel assigned to 3E0X2, Electrical Power Production, 3P0X1, Security Forces and

1C6X1, Space Systems Operations. Results showed that the expected highest number of months of mission-ready service was for recruits assigned to 1C0X2, Aviation Resources Management, 3M0X1, Services, and 1C7X1, Airfield Management.

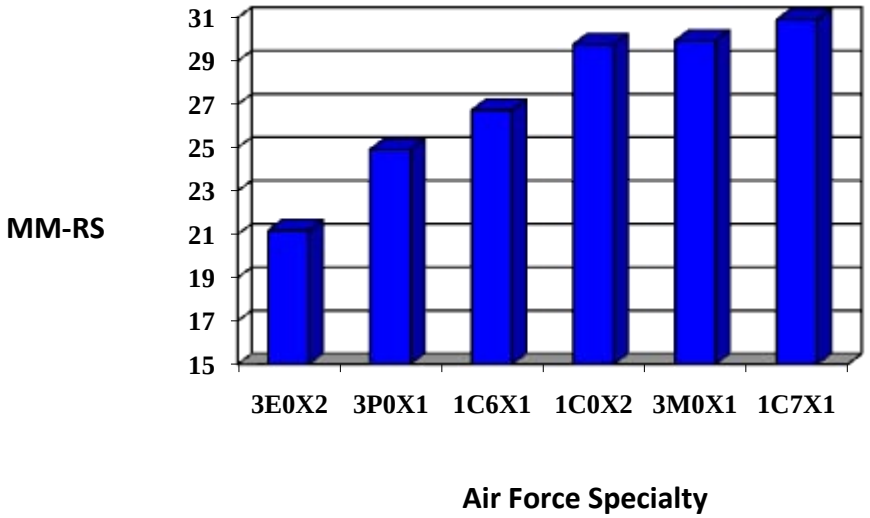


Figure 10. Expected Values of MM-RS for Air Force Specialties.

Optimization Analyses

Optimization analyses were performed using the sample of 24,381 enlistees where each person's expected MM-RS was estimated from within-group regression equations across all 24 sample specialties. The full set of predictor variables was constrained for the within-specialty analyses to account for the fact that certain of the variables (i.e., gender and racial/ethnic background) are legally restricted from use as explicit selection factors in institutional selection systems. For this constrained solution, knowledge of gender and racial/ethnic group was dropped from the estimating equations and the optimized enlistee assignments. These were obtained to fully exercise the predictor set in defining upper (and later lower) bound benefit estimates to address the question: How much improvement could be obtained if all enlistees in the sample were reassigned in such a way as to maximize the overall amount of MM-RS. As a baseline, we knew that the actual number of MM-RS obtained with the present assignments was 24.22. For reference purposes, we also looked at what would happen if the prediction estimates were used to minimize MM-RS by reassigning people where it would least desirable to assign them. Finally, we simulated what would happen to average MM-RS if people were assigned at random without any consideration of their aptitudes or background status. To summarize, four benchmarks were obtained to provide perspective on the simulated assignments: a) the maximum benefit level, b) the minimum benefit, c) the benefits expected from random reassignment and d) the current level of benefit obtained from the enlistees' actual assignments.

Results from the analyses using the constrained set of predictors showed that the theoretical lower and upper bounds on the assignment solutions were 18.5 MM-RS and 27.4 MM-RS respectively (Figure 11). This range translates into a difference of almost nine MM-RS

between the best and worst sets of assignments that one might conceive. The random assignment value was 23.25 MM-RS, about mid-way between the upper and lower extremes. In comparison, the actual MM-RS value obtained under current accession and classification procedures was 24.22 months indicating that current accession policy increases the average amount of MM-RS about +1 month per enlistee over the random assignment value.

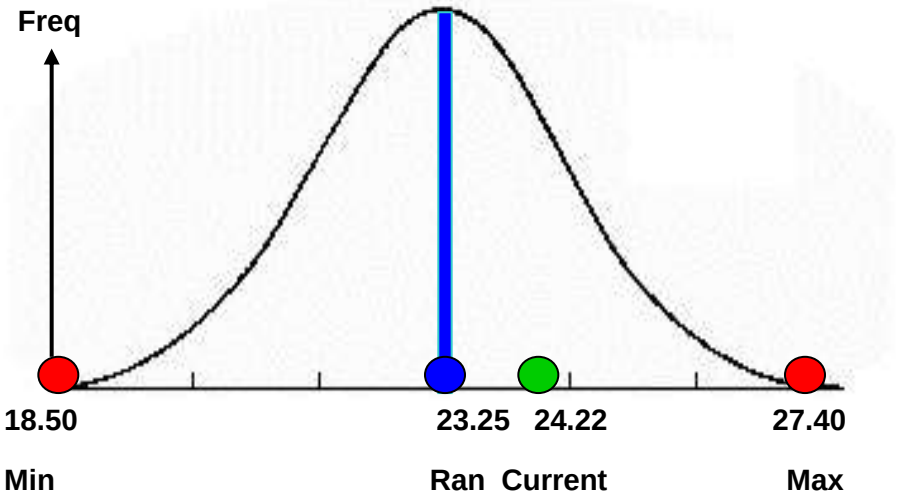


Figure 11. Family of Assignment Solutions in Units of MM-RS Per Enlistee.

Based on the sample of 24,381 recruits, his translates into a gain of 17,068 MM-RS over random assignment or about 3%.

The higher value of 27.4 months showed that an approximate + 3 month gain per enlistee over current assignment benefits could be realized even when information about gender and racial/ethnic group was not explicitly considered in the estimation or assignment processes. Figure 11 shows the relationship of these values as part of a large family of solutions that might be obtainable using simple random reassignments as a baseline where the optimization process allows the specification of the best- and worst-case scenarios using the MM-RS metric. The aggregate number of mission-ready months generated by these solutions was substantial as shown graphically in Figure 12. Under current recruiting conditions the sample of 24,381 enlistees contributed an aggregate total of (24,381 x 24.22) 590,507 mission-ready months of service. The most and least amount of cumulative MM-RS obtainable were 668,093 MM-RS under the optimized condition and 451,048 MM-RS under the minimized condition. The value reflecting random assignment was 566,858 cumulative MM-RS. The optimized value of 668,093 was a potential increase of 13% over the current number of cumulative mission-ready months of 590,507 and 16.5% over random assignment.

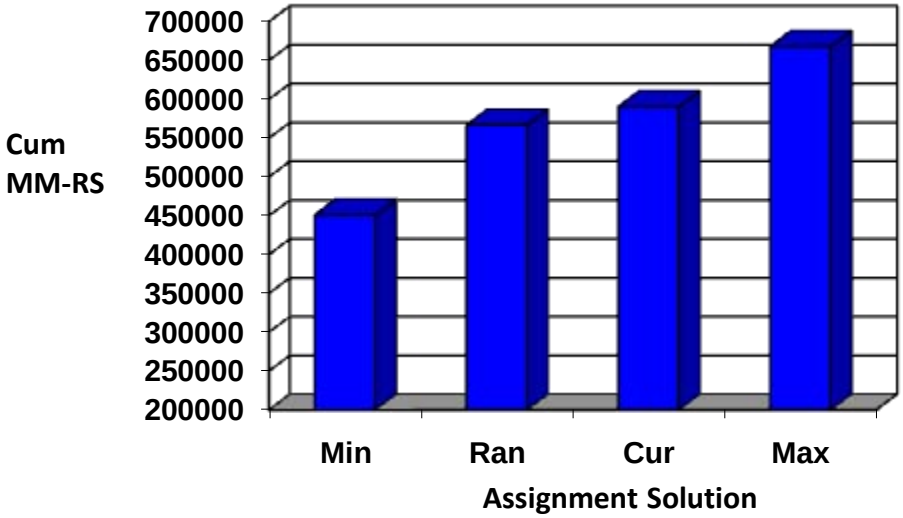


Figure 12. Cumulative MM-RS by Assignment Solution.

Figure 13 shows the results of the four solutions in terms of the equivalent numbers of current personnel necessary to generate the four respective cumulative MM-RS values. The number of current enlistees in the sample (Cur = 24,381) can be compared to the equivalent number of 27,582 enlistees in the optimized (Max) condition, 18,623 enlistees in the minimized (Min) condition, and 23,405 enlistee equivalents under random (Ran) assignment.

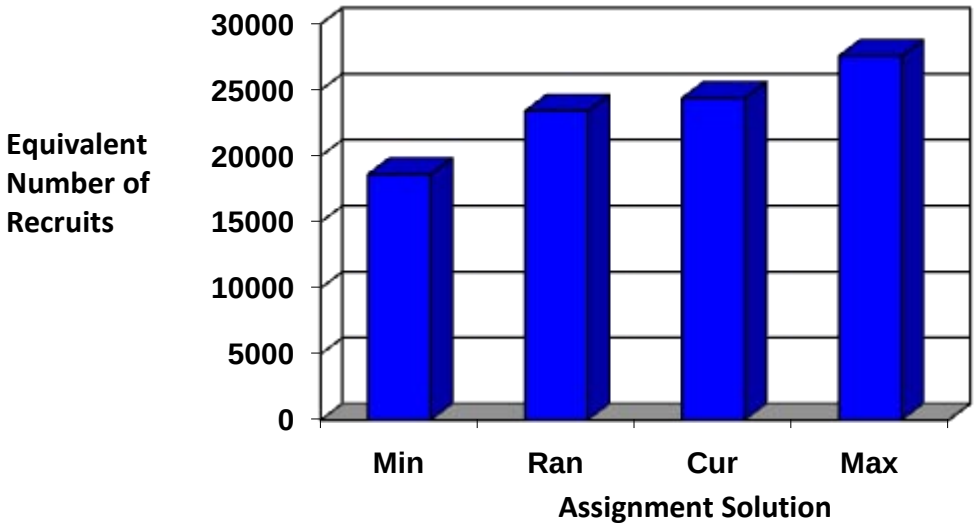


Figure 13. MM-RS Equivalent Manpower by Assignment Solution.

The optimized solution was taken as an exemplar for more detailed analyses at the specialty level. The purpose was to look in a more refined way into the representative differences between the current and newly optimized specialties to see what changes were made that might be informative of better assignment practice. These results are summarized in Table 9 for each of the 24 specialties in the sample. A detailed breakout of the aptitude and background factors by specialty is provided in Appendix B which compares the current profile with the optimized profile.

It can be seen from Table 9 that the distribution of the optimized benefits was not equivalent across specialties. Some AFSs benefited more than others but all had positive gains, with one exception, in the range of .27 months to 18.2 months with an average gain across specialties of 4.87 MM-RS. Note that average gain across specialties is not the same value as the overall gain across people because the latter number is weighted proportionately to the different sample sizes in each specialty. The one exception to the overall improvement was 3C0X1, Communications/Computer Systems Operator which exhibited a slightly higher than average MM-RS value of 26.13 prior to the optimization but lost a quarter of a man-year in the overall process. There are undoubtedly other slightly suboptimal solutions where the distribution of benefits could have been adjusted to be more equivalent. But for an initial technology demonstration, this solution was thought to suffice in showing how the composition of the specialties change from current to a more optimal configuration.

A summary comparison of specialty-specific results between the current characteristics of personnel assigned to the specialties (labeled Actual) and the optimally obtained assignments (labeled Optimal) is shown in Appendix B. These tables highlight how the aptitude profiles and background characteristics of each specialty differ in the process of obtaining the highest overall system-wide gain in mission-ready service.

For example, the aptitude comparisons showed that several AFSs would benefit from higher mean scores on the ASVAB, notably 2T0X1, 1C6X1, 1C0X2, 3P0X1 and most especially 2M0X3 Missile and Space Facilities where current scores are mostly in the high 40s to low 50s range (except MK = 57). Optimized scores were from 5-15 points higher across the board indicating that raising the current aptitude standards in this specialty would be of benefit in terms of increased MM-RS. Nine specialties on the other hand should have reduced aptitude requirements based on these comparisons: 2A6X3, 1C1X1, 3C0X1, 2W0X1, 1N0X1, and 1A8X1. Three of the nine could be substantially reduced. In particular aptitude entry requirements could be reduced for 3E0X2 Electrical Power Production (7-14 points), 2A3X2 Avionics Systems (5-19 points) and 2A6X6 Aircraft Electrical & Environmental Systems (7 -11 points).

Interpretation of the individual tables in the appendix can be illustrated by selecting one set as an example. In 2W0X1 Munitions Systems, we find on the aptitude comparisons that the optimized group scores are from 4-9 points lower than in the current (pre-optimized) group. By lowering these scores by this amount across all subtests, higher MM-RS could be expected. The background comparisons show that the differences on the educational qualifications were slight between the two groups so no change was implied. On the age factor, a higher proportion (47.7%) of the optimized group were in the youngest age category (17-18) than in the current group (32.8%) indicating that younger enlistees might be preferred in this specialty. In the next set of comparisons, a higher proportion of enlistees in the optimized group (30.6%) were 4-Year guaranteed entrants with a bonus vs. 10.2% in the current group. There were correspondingly fewer 6-Year guaranteed enlistees with accelerated promotion and a bonus (69.4%) in the optimized group compared to 83.9% in the current group. The waiver variable indicated only small differences between the groups. On selector AI fit, more enlistees in the "qualified" range (0-9 point above the minimum) were found in the optimized group (53.2%) than in the current

group (24.4%) and fewer in the under-qualified group (6.3%) compared to that found the current group (32.6%).

Table 9. Optimization Results by AF Specialty (Constrained Model)

AFS Code	Title	Actual MM-RS Mean	Optimal MM-RS Mean	Difference
3E0X2	Electrical Power Production	27.18	31.50	4.32
2A6X6	Aircraft Electrical & Environmental System	27.47	27.74	0.27
2A6X3	Aircrew Egress Systems	27.45	35.16	7.71
2T0X1	Traffic Management	25.55	32.01	6.46
3A0X1	Information Management	24.91	26.17	1.26
3S0X1	Personnel	24.99	26.92	1.93
3C0X1	Communications-Computer Systems Operator	26.13	25.90	-0.23
3M0X1	Services	22.30	26.95	4.65
6F0X1	Financial Management & Comptroller	25.67	28.35	2.68
3C2X1	Communications-Computer Systems Control	25.67	27.84	2.17
3E0X1	Electrical (Civil Engineering)	25.27	29.10	3.83
2E6X3	Voice Network Systems	27.03	33.45	6.42
2T1X1	Vehicle Operations	25.45	29.37	3.92
1C1X1	Air Traffic Control	23.12	27.56	4.44
2W0X1	Munitions Systems	26.93	27.48	0.55
1C0X2	Aviation Resource Management	25.80	31.01	5.21
3C1X1	Radio Communication Systems	24.11	32.60	8.49
1C7X1	Airfield Management	28.07	30.69	2.62
3P0X1	Security Forces	21.49	25.15	3.66
1N0X1	Operations Intelligence	26.74	32.63	5.89
1A8X1	Airborne Cryptologic Linguist	19.85	26.15	6.30
1C6X1	Space Systems Operations	26.20	36.00	9.80
2A3X2	F-16, F-117, RQ-1, CV-22 Avionic Systems	25.20	31.60	6.40
2M0X3	Missile & Space Facilities	24.50	42.70	18.2
	Total Sample Mean	25.30	30.17	4.87

Effects of Selection and Classification Combined

The previous optimization analyses capitalized exclusively on "assignment" effects in that all enlistees were assigned back to fill the initial manpower requirement. The effects of changes in the selection ratio where some proportion of the applicant pool can be rejected were explored in two ways. First, manpower requirements were reduced by 15% across all 24 specialties so that a comparable proportion of the total entrants could be placed into a non-select status. Normally, a 15% reduction in personnel would yield a corresponding decrease in productive capacity. When optimized, those recruits with the least MM-RS potential across the 24 specialty areas were set aside into a rejected category while the top 85% were optimally assigned to fill the reduced quota. The average MM-RS per enlistee in the current assignment was 24.2 yielding 590, 608 cumulative MM-RS. By virtue of the improvement in average MM-RS when the least capable 15% were non-selected, the average MM-RS per enlistee increased to 28.0 which yielded 580,318 cumulative MM-RS. This was only a 2% reduction in productive capacity despite a 15% reduction in overall manpower.

The second way to simulate an increase in selectivity on total MM-RS was to take the original cohort of 24,381 cases and create additional applicants by randomly cloning random cases from the original cohort. We could then simulate optimization scenarios where the number of enlistee candidates considered (the applicant pool) was increased so that the rejection ratios could be simulated at higher than 0% as was the case in the initial simulations. We looked at rejection ratios of 10% through 50% in increments of 10% while existing manpower requirements were left unchanged. In the 50% condition, the number of applicants was simply doubled so that an equal numbers of recruits (24,381) could be selected and rejected. Results of these analyses are plotted in Figure 14. There was an approximate upward linear progression in average MM-RS per recruit from the 0% rejection rate which yielded an optimized mean of 27.4 MM-RS to the 50% rejection rate where the mean MM-RS per enlistee increased to 29.2. This was about a one month increase in average MM-RS per enlistee for every 25% increase in rejection ratio. It should be noted that the number of additional recruits increases at a nonlinear rate as the rejection increases from 0% to 50%. A rejection rate of 10% requires only 11% more recruits whereas a rejection rate of 20% increase requires a 25% increase in applicants, a substantially greater number. At 50% rejection, the service would need twice as many or 100 percent more recruits. The best way to summarize these effects would be to say that the initial return on investments in recruiting would yield the highest benefits if the selection rate were marginally increased over the present value. Additional increments in rejection ratio would cost correspondingly more to obtain, with progressively less return in benefit. The functional form would take the form of a negatively accelerating logistic curve showing higher gains initially with a distinct tapering off as selectivity was increased to higher levels. Moreover, the incremental cost of each additional recruit would also likely increase as more applicants were acquired as documented by Armor et al. (1982) and others. The smaller rates of return on investment coupled with increasing costs would likely limit management options to exploring only the lower range of rejection rate values up to possibly 20% before the costs would become prohibitive.

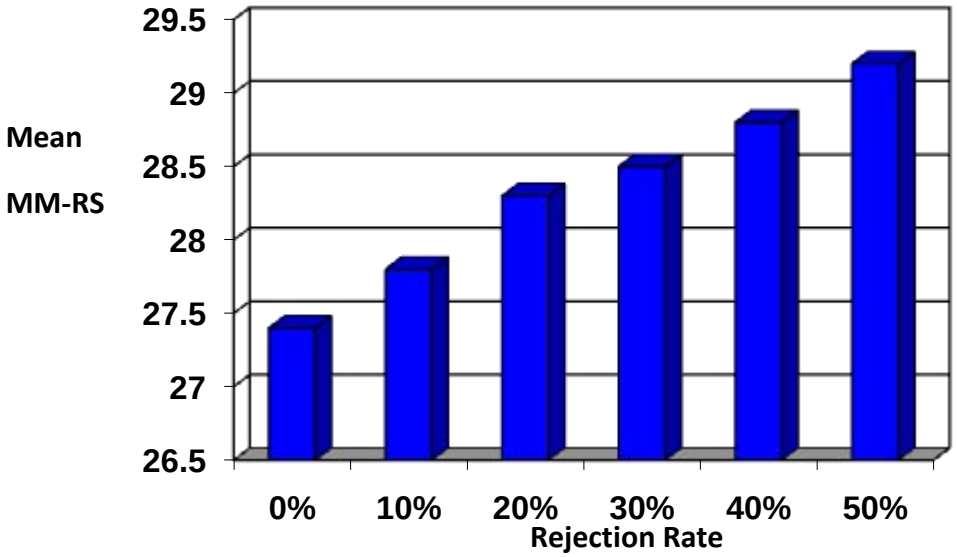


Figure 14. Effect of Rejection Rate on MM-RS.

VI. IMPLICATIONS AND FUTURE DIRECTIONS

This study demonstrated the feasibility of deriving meaningful productivity measures for enlisted personnel from information routinely available in archival records. The most promising indicator, months of mission-ready service (MM-RS), combines longevity of service with skill acquisition at the journeyman level. The amount of available MM-RS has meaning for both individual service personnel and for larger cohort groups. Unlike many performance measures (training grades, achievement scores, performance test results), MM-RS can be aggregated and evaluated for military members grouped in specialties, in particular year groups, or force wide.

The present study demonstrated that about half of a typical enlisted person's initial 48-month commitment is spent in mission-ready status. To obtain a full 48 months of MM-RS requires on average two incoming recruits. For every 100 recruits the Air Force can expect 2,400 MM-RS over four years. If the average number of expected MM-RS for each recruit could be raised from 24 to 26 months, then the same total amount of MM-RS could be obtained with 92 recruits. Alternately, the productive capacity of 100 recruits with higher expected MM-RS would yield 2,600 MM-RS or an 8 percent increase in work capacity.

For the study analysis sample, MM-RS varied individually from zero months for early attrits to 38 months for the most persevering and accomplished recruits. Values of MM-RS for most personnel fell within 24 $\pm$ 11 months. Moreover, the study showed that substantial variance in the measures could be accounted for by aptitude and background characteristics, enlistment options, and the AFS to which the recruits were originally assigned. If recruiting emphasis were to be directed toward applicants who are older, better educated, have higher

specific aptitude, and who do not need waivers for serious offences, the process would be expected to attract recruits with higher expected MM-RS. The study results showed the value of longer enlistment contracts. Longer enlistment options would be better managed if the number of 6-year contracts was increased and if they were directed at recruits with better prospects for providing mission-ready service.

A strategy related to job assignments rather than to selection standards in general would be to classify applicants in specialties where their backgrounds would contribute to higher than average MM-RS. This could be accomplished during the AFS booking process with computerized lists of available jobs rank-ordered from highest to lowest on an individual recruit's expected MM-RS. Beyond initial entry, the study results suggest that the Air Force would benefit by reviewing its process for encouraging service continuation and skill upgrading for all personnel, especially those "at risk" for early separation and with lower prospects for timely skill upgrade.

The simulated assignment exercises indicated that present classification methods increase expected MM-RS about +1 month over random assignment. With a more optimized process, it would be feasible to increase the average to +2 or +3 MM-RS. Further, if the selection ratio was improved from what it is presently to higher levels, additional gains in MM-RS could be achieved.

The scope of the present project has broadly addressed the issue of productivity metrics for first term enlisted personnel from concept and derivation to prediction from accession factors and finally, to potential utilization in simulated selection and assignment exercises. Based on these results, we believe there is considerable promise in a measure called Months of Mission-Ready Service (MM-RS). Combining longevity and skill achievement, MM-RS has characteristics that favor it as an individual measure of merit and as a method for evaluating larger personnel entities such as specialties, entry cohorts, work centers, and total force aggregations in a new and important way. In particular, recruiting and enlistment standards which directly affect MM-RS should be reviewed and revised accordingly to gain the most from limited resources available for replenishing the force.

The work described is an initial demonstration which could be refined and expanded in several respects. Suggestions for future work include refining the MM-RS measure as an indicator of job performance and expanding its utility for evaluating Air Force recruiting, selection, and classification programs. Certainly a more refined weighting strategy could be explored where the simple half-weighting of 3-level months could be replaced with a metric which took into account a better approximation of 3-level contributions to productivity. The metric can and should be refined by adjusting the credit for 3-level months by excluding time spent in basic and technical training. Another possibility would be to use available archival files to extend the 4-year follow up period used in this study to 6 to 8 years beyond the service entry point for enlisted members. The number of AFSs examined could also be increased from the 24 selected for the study sample to all those for which sufficient data reside in the personnel files. Past experience with traditional ASVAB validity studies would suggest the number of AFSs could be extended to something on the order of 100 specialties before sample sizes would begin to limit generalizations about the findings.

An additional research opportunity exists that would focus on the aptitude predictors with the objective of redefining the composites for various clusters of AFSs based on MM-RS in the same manner that the present MAGE composites were developed for predicting technical training success. The MM-RS measure also has potential for tracking recent recruit cohorts from 2003 to 2008 to determine if trends in mission-ready capability are increasing, decreasing, or remaining steady. Air Force strategic goals such as those broadly outlined in the USAF Personnel Strategic Plan (Fiscal Year 2004 – 2009) (USAF, 2004) and other long-range planning documents are often linked to recommended performance measures to determine the extent to which strategic objectives are being met. A measure of mission-ready service at the Air Force level formulated using the procedures developed in this study could be incorporated as a primary metric for assessing future Air Force strategic plans for personnel programs and services.

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Appendix A: Basic and Generated Variables

Basic Variables (B1 through B31):

1. Accession Date – TAFMSD used to determine 00-02 time ranges. Purge database of any TAFMSD Dates that exceed 01/01/2000- 12/31/2002.
2. Study AFSC – AFSC are determined through steps where priority is given to Five_lvl_afsc. If Five_lvl_afsc is absent, utilize Three_lvle_afsc. If Three_lvl_afsc is absent, utilize AFSC. If AFSC is absent, utilize accession_pafsc.

2.a. AFSC Code – Convert Study AFSC (B2) where: 3E0X2 = 1, 2A6X6 = 2, 2A6X3 = 3, 2TOX1 = 4, 3A0X1 = 5, 3S0X1 = 6, 3C0X1 = 7, 3M0X1 = 8, 6F0X1 = 9, 3C2X1 = 10, 3E0X1 = 11, 2E6X3 = 12, 2T1X1 = 13, 1C1X1 = 14, 2W0X1 = 15, 1C0X2 = 16, 3C1X1 = 17, 1C7X1 = 18, 3P0X1 = 19, 1N0X1 = 20, 1A8X1 = 21, 2M0X3 = 22, 1C6X1 = 23, 2A3X2 = 24.

3. AFQT – AFQT_PCT
4. GS – GS_STD1
5. AR – AR_STD2
6. WK – WK_STD3
7. PC – PC_STD4
8. MK- MK_STD5
9. EI – EI_STD6
10. AS – AS_STD7
11. MC – MC_STD8
12. AO – AO_STD9
13. Mech AI – M2
14. Admin AI – A2
15. Gen AI – G
16. Elect AI – E
17. Selector AI Minimum for AFSC – specific minimum score designated by priority AI per specialty
18. Selector AI – actual score obtained on specific selector AI by airman per specialty
19. Gender – GENDER
20. Racial Group – RACE
21. Ethnic Group – HispanicLatinDeclaration_HR
22. Education Level – accession_education_lvl
23. Date of Birth – DATE_OF_BIRTH
24. Age at Entry – Calculated as the difference in years between TAFMSD and DATE_OF_BIRTH
25. Term of Enlistment – TERM_OR_ENLISTMENT
26. Accession Category – ACCES_DESIGNATION_NR

26.a. Waivers Status Recode– WAIVER_APP_LVL CONTEXT where Not Applicable/None = 0, Felony (Adult and Juvenile) = 1, Other (Non Minor) Misdemeanor = 2, Minor Non Traffic (<3 and 3+) and Minor Traffic = 3, and Other Waiver = 4

27. TAFMSD – TAFMSD
28. TAFMSD + 4 years – TAFMSD projected out 4 years
29. Five Level Date – Five_lvl_date (Date awarded 5 skill level)
30. Last Date on File – LAST_DATE_ON_FILE
31. Retained- SEP_RSN

Generated Variables (G31a through G148)

31.a. Binary AFSC (3E0X2) coded 1 if B2a = 1; 0 otherwise
31.b. Binary AFSC (2A6X6) coded 1 if B2a = 2; 0 otherwise
31.c. Binary AFSC (2A6X3) coded 1 if B2a = 3; 0 otherwise

31.d. Binary AFSC (2TOX1) coded 1 if B2a = 4; 0 otherwise
31.e. Binary AFSC (3A0X1) coded 1 if B2a = 5; 0 otherwise
31.f. Binary AFSC (3S0X1) coded 1 if B2a = 6; 0 otherwise
31.g. Binary AFSC (3C0X1) coded 1 if B2a = 7; 0 otherwise
31.h. Binary AFSC (3M0X1) coded 1 if B2a = 8; 0 otherwise
31.i. Binary AFSC (6F0X1) coded 1 if B2a = 9; 0 otherwise
31.j. Binary AFSC (3C2X1) coded 1 if B2a = 10; 0 otherwise
31.k. Binary AFSC (3E0X1) coded 1 if B2a = 11; 0 otherwise
31.l. Binary AFSC (2E6X3) coded 1 if B2a = 12; 0 otherwise
31.m. Binary AFSC (2T1X1) coded 1 if B2a = 13; 0 otherwise
31.n. Binary AFSC (1C1X1) coded 1 if B2a = 14; 0 otherwise
31.o. Binary AFSC (2W0X1) coded 1 if B2a = 15; 0 otherwise
31.p. Binary AFSC (1C0X2) coded 1 if B2a = 16; 0 otherwise
31.q. Binary AFSC (3C1X1) coded 1 if B2a = 17; 0 otherwise
31.r. Binary AFSC (1C7X1) coded 1 if B2a = 18; 0 otherwise
31.s. Binary AFSC (3P0X1) coded 1 if B2a = 19; 0 otherwise
31.t. Binary AFSC (1N0X1) coded 1 if B2a = 20; 0 otherwise
31.u. Binary AFSC (1A8X1) coded 1 if B2a = 21; 0 otherwise
31.v. Binary AFSC (2M0X3) coded 1 if B2a = 22; 0 otherwise
31.w. Binary AFSC (1C6X1) coded 1 if B2a = 23; 0 otherwise
31.x. Binary AFSC (2A3X2) coded 1 if B2a = 24; 0 otherwise

32. AFQT = B3
33. GS = B4
34. AR = B5
35. WK = B6
36. PC = B7
37. MK = B8
38. EI = B9
39. AS = B10
40. MC = B11
41. AO Available (yes) coded 1 if B12 is present; 0 otherwise
42. AO Available (no) coded 1 if B12 is absent; 0 otherwise
43. AO = B12 if G41 coded 1
44. M = B13
45. A = B14
46. G = B15
47. E = B16
48. Selector AI Difference (difference of M, A, G, or E, depending on B18, and AFSC Selector AI B17)
49. Binary AI Fit coded 1 if G48 = 0 – 9 points above AI; 0 otherwise
50. Binary AI Fit coded 1 if G48 = 10 – 19 above AI; 0 otherwise
51. Binary AI Fit coded 1 if G48 = 20 or more points above AI; 0 otherwise

51a. Binary AI Fit coded 1 if G48 = any value below AI (less than 0); 0 otherwise

52. Binary Gender (Male) coded 1 if B19 = M; 0 otherwise
53. Binary Gender (Female) coded 1 if B19 = F; 0 otherwise
54. Binary Racial/Ethnic Group (Unknown) coded 1 if B20 = F or G; 0 otherwise
55. Binary Racial/Ethnic Group (Black/African American) coded 1 if B20 = C; 0 otherwise
56. Binary Racial/Ethnic Group (White/non-Hispanic/non-Latino) coded 1 if B20 = E and B21 = 2 or 3; 0 otherwise
57. Binary Racial/Ethnic Group (White/Hispanic/Latino) coded 1 if B20 = E and B21 = 1; 0 otherwise

58. Binary Racial/Ethnic Group (Other/Mixed) coded 1 if B20 = any other code except those listed above; 0 otherwise
59. N/A
60. N/A
61. N/A
62. Binary Education Level (Unknown) coded 1 if B22 = Y or absent; 0 otherwise
63. Binary Education Level (Less than HS) coded 1 if B22 = 0, 2, 3, 4, 5, 6, A, or B; 0 otherwise
64. Binary Education Level (Alternative Certification) coded 1 if B22 = C; 0 otherwise
65. Binary Education Level (HS Diploma) coded 1 if B22 = D; 0 otherwise
66. Binary Education Level (High School +) coded 1 if B22 = E, F, G, H, J, N, O, or P; 0 otherwise
67. N/A
68. N/A
69. N/A
70. N/A
71. Binary Date of Birth (Range 1) code 1 if B23 = 12/1975 and below; 0 otherwise
72. Binary Date of Birth (Range 2) coded 1 if B23 = 1/1976 – 12/1980; 0 otherwise
73. Binary Date of Birth (Range 3) coded 1 if B23 = 1/1981 – 12/1985; 0 otherwise
74. Binary Date of Birth (Range 4) coded 1 if B23 = 1/1986 and above; 0 otherwise
75. N/A
76. N/A
77. N/A
78. Binary Age of Entry (Range 1) coded 1 if B24 = 17 or 18; 0 otherwise
79. Binary Age of Entry (Range 2) coded 1 if B24 = 19 or 20; 0 otherwise
80. Binary Age of Entry (Range 3) coded 1 if B24 = 21 or 22; 0 otherwise
81. Binary Age of Entry (Range 4) coded 1 if B24 = 23 or 24; 0 otherwise
82. Binary Age of Entry (Range 5) coded 1 if B24 = 25 or 26; 0 otherwise
83. Binary Age of Entry (Range 6) coded 1 if B24 = 27 and over; 0 otherwise
84. Binary Accession Reason (4-Year Open, No Bonus) coded 1 if B26 = 4; 0 otherwise
85. Binary Accession Reason (4-Year Guar., No Bonus) coded 1 if B26 = 12; 0 otherwise
86. Binary Accession Reason (4-Year Open, With Bonus) coded 1 if B26 = 28; 0 otherwise
87. Binary Accession Reason (6-Year Guar., Accelerated Promotion, No Bonus) coded 1 if B26 = 13; 0 otherwise
88. Binary Accession Reason (6-Year Guar., Accelerated Promotion, With Bonus) coded 1 if B26 =59; 0 otherwise

89. Binary Accession Reason (Indeterminate/Unknown) coded 0 if B26 = 4, 12, 13, 28, and 59; 1 otherwise
90. N/A
90.a. N/A
90.b. Binary Waivers (Not Applicable) coded 1 if B26a = 0; 0 otherwise
90.c. Binary Waivers (Felony) coded 1 if B26a = 1; 0 otherwise
90.d. Binary Waivers (Serious Misdemeanor) coded 1 if B26a = 2; 0 otherwise
90.e. Binary Waivers (Minor Traffic/Non Traffic) coded 1 if B26a = 3; 0 otherwise
90.f. Binary Waivers (Other/Predominately Mental Qualifications) coded 1 if B26a = 4; 0 otherwise

91. **Total Months of Service:** Calculated as the difference in months between the last date on file LAST_DATE_ON_FILE (B30) and the total active Federal military service date TAFMSD (B27).
Total Months of Service = 0 when:

- LAST_DATE_ON_FILE (B30) < TAFMSD (B27).

Total Months of Service = 48 when:

- LAST_DATE_ON_FILE (B30) > TAFMSD + 4 years (B28).

Otherwise: Total Months of Service = LAST_DATE_ON_FILE (B30) – TAFMSD (B27).

92. **Total Months of Service at the 5 Level**: Calculated as the difference in months between the TAFMSD projected out 4 years (B28) and the date the 5 Level status has reached Five_lvl_date (B29). Total Months of Service at the 5 Level = 0 when:

- Five_lvl_date (B29) is missing
  OR
- Five_lvl_date (B29) > TAFMSD + 4 years (B28)
  OR
- Five_lvl_date (B29) < TAFMSD (B27)
  OR
- Five_lvl_date (B29) > LAST_DATE_ON_FILE (B30)

Total_Months5Level = TAFMSD + 4 years – Five_lvl_date when:

- LAST_DATE_ON_FILE > TAFMSD + 4 years.

Otherwise: Total_Months5Level= LAST_DATE_ON_FILE - Five_lvl_date.

93. **Total Months of Service at the 3 Level:** Calculated as the difference between the Total_Months_OfService(G91) and Total_Months5Level(G92).

- Total_Months3Level = Total_Months_OfService - Total_Months5Level

93.a. **Months of Productive Service (MPS):** Calculated by combining the number of Total Months of Service at the 3 Level (G93) and the number of Total Months of Service at the 5 Level (G92) as follows: the composite is formed by summing the G92 months together with half-weighted G93 where MPS = .5 (3-level months) + 1.0 (5-level months).

99-114: **Binary representation of presence, absence, and presence at the 5 level status.**

0- Not in service for that quarter
1- In service for that quarter
2- In service for that quarter and at level 5 status.

A total of 16 vectors are created to represent the 16 quarters (4 years) of service that is being captured in this analysis. Each vector consists of 0s, 1s, or 2s depending on whether the individual is in active service during the quarter being represented and whether the individual is at the 5 level for their AFSC.

$Q_{N,Obs}$: Quarter vector where N = 1 to 16 quarters and Obs = 1 to the total number of observations in the dataset.

i: Number of months where i = 3 to 48 months in increments of 3.

The following check is made for each observation in the dataset:
$Q_{N,Obs}$ = 2 when:

- Five_lvl_date(B29) is not missing or null AND Total_Months_OfService(G91) > i-3
  OR
- Total_Months_OfService (G91) ≥ i AND Total_Months3Level(G93) < i-3
  OR
- Total_Months3Level (G93) < or = i months.

$Q_{N,Obs}$ = 1 when:

- Total_Months_OfService(G91) > i-3
  OR

- Total_Months_OfService(G91) ≥ i months.

$Q_{N,Obs}$ = 0 otherwise.

115. **Multiple Regression Predicted Scores for Total Months of Service:** Calculated with Multiple Regression of Predictors G32-40, G49-58, G62-66, G71-74, G78-90a and Criterion Total Months of Service (G91). Predicted score values are in months.

116. **Multiple Regression Predicted Scores for Total Months of Service at the 5 Level:** Calculated with Multiple Regression of Predictors G32-40, G49-58, G62-66, G71-74, G78-90a and Criterion Total Months of Service at the 5 Level (G92). Predicted score values are in months.

117 - 132. **Logistic Regression Predicted Scores for Quarters 1 – 16 distinguishing 0 vs. 1 and 2 combined (Out vs. In):** Calculated with Logistic Regression Predictors G32-40, G49-58, G62-66, G71-74, G78-90a and Criterion of each quarter where 0 represents out of service and 1 represents a combination of 1 (3-Level) and 2 (5-Level) in service status.

133 – 148. **Logistic Regression Predicted Scores for Quarters 1 – 16 distinguishing 1 vs. 2 (3-Level vs. 5-Level status):** Calculated with Logistic Regression Predictors G32-40, G49-58, G62-66, G71-74, G78-90a and Criterion of each quarter where 0 represents 1 (3-Level status) and 1 represents 2 (5-Level status).

Appendix B: Pre- and Post-Optimization Differences by AFSC

Note: Numbers shown in black indicate increases; those shown in red indicate decreases.

AFSC and Title	Actual		Optimized		Difference	
	N	%	N	%	N	%
3E0X2 Electrical Power Production	**526**		**526**			
Education Level						
Unknown	*122*	*23.2*	*100*	*19.0*	***-22***	***4.19***
Less than High School	*6*	*1.1*	*0*	*0.0*	***-6***	***1.10***
Alt. Certification	*9*	*1.7*	*0*	*0.0*	***-9***	***1.70***
High School Diploma	*339*	*64.4*	*405*	*77.0*	***66***	***12.60***
High School +	*50*	*9.5*	*21*	*4.0*	***-29***	***5.51***
Age at Entry (years)						
17,18	*144*	*27.4*	*203*	*38.6*	***59***	***11.19***
19,20	*204*	*38.8*	*166*	*31.6*	***-38***	***7.24***
21,22	*107*	*20.3*	*55*	*10.5*	***-52***	***9.84***
23,24	*37*	*7.0*	*44*	*8.4*	***7***	***1.37***
25,26	*24*	*4.6*	*17*	*3.2*	***-7***	***1.37***
27 and over	*10*	*1.9*	*41*	*7.8*	***31***	***5.89***
Accession Category						
4-Year Open, No Bonus	*5*	*1.0*	*24*	*4.6*	***19***	***3.56***
4-Year Guar., No Bonus	*24*	*4.6*	*449*	*85.4*	***425***	***80.76***
4-Year Guar., With Bonus	*80*	*15.2*	*17*	*3.2*	***-63***	***11.97***
6-Year Guar., Acc. Promotions, No Bonus	*0*	*0*	*0*	*0.0*	***0***	***0.00***
6-Year Guar., Acc. Promotions, With Bonus	*410*	*77.9*	*36*	*6.8*	***-374***	***71.06***
Unknown	*7*	*1.3*	*0*	*0.0*	***-7***	***1.30***
Waiver Status						
None	*457*	*86.9*	*329*	*62.5*	***-128***	***24.35***
Felony	*3*	*.6*	*1*	*0.2*	***-2***	***0.41***
Serious Misdemeanor	*20*	*3.8*	*0*	*0.0*	***-20***	***3.80***
Minor Misdemeanor	*25*	*4.8*	*70*	*13.3*	***45***	***8.51***
OtherWaiver	*21*	*4.0*	*126*	*24.0*	***105***	***19.95***
Selector AI						
(0 – 9 points above selector AI)	*154*	*29.3*	*179*	*34.0*	***25***	***4.73***
(10 – 19 above selector AI)	*128*	*24.3*	*180*	*34.2*	***52***	***9.92***
(20 + above selector AI)	*153*	*29.1*	*146*	*27.8*	***-7***	***1.34***
(Any value below selector AI)	*91*	*17.3*	*21*	*4.0*	***-70***	***13.31***

Gender						
Male	*515*	*97.9*	*245*	*46.6*	***-270***	***51.30***
Female	*11*	*2.1*	*281*	*53.4*	***270***	***51.30***
Race/Ethnicity						
Unknown	*38*	*7.2*	*479*	*8.9*	***441***	***1.70***
Black	*93*	*17.7*	*241*	*45.8*	***148***	***28.10***
White	*294*	*55.9*	*117*	*22.2*	***-177***	***33.70***
Hispanic	*45*	*8.6*	*35*	*6.7*	***-10***	***1.90***
Other/Mixed	*56*	*10.6*	*86*	*16.3*	***30***	***5.70***

AFSC and Title	**Actual**		**Optimized**		**Mean Difference**
	Mean	**SD**	**Mean**	**SD**	
3E0X2 Electrical Power Production					
General Science (GS)	55.57	5.73	47.30	6.42	**-8.27**
Arithmetic Reasoning (AR)	55.58	5.93	46.23	4.32	**-9.35**
Word Knowledge (WK)	54.24	4.14	47.70	4.27	**-6.54**
Paragraph Comprehension (PC)	55.00	4.95	47.90	5.21	**-7.10**
Auto and Shop Information (AS)	53.61	6.53	40.14	5.44	**-13.47**
Math Knowledge (MK)	56.77	6.28	54.92	5.54	**-1.85**
Mechanical Comprehension (MC)	57.70	5.76	44.99	6.31	**-12.71**
Electronics Information (EI)	54.77	6.16	43.12	6.01	**-11.65**

AFSC and Title	Actual		Optimized		Difference	
	N	%	N	%	N	%
2A6X6 Aircraft Electrical & Environmental Systems	**1055**		**1055**			
Education Level						
Unknown	*311*	*27.8*	*114*	*10.2*	***-197***	***17.62***
Less than High School	*14*	*1.3*	*0*	*0.0*	***-14***	***1.30***
Alt. Certification	*15*	*1.3*	*0*	*0.0*	***-15***	***1.30***
High School Diploma	*687*	*61.3*	*900*	*80.4*	***213***	***19.06***
High School +	*93*	*8.3*	*106*	*9.5*	***13***	***1.16***
Age at Entry (years)						
17,18	*469*	*41.9*	*236*	*21.1*	***-233***	***20.83***
19,20	*366*	*32.7*	*703*	*62.8*	***337***	***30.07***
21,22	*171*	*15.3*	*142*	*12.7*	***-29***	***2.62***
23,24	*71*	*6.3*	*38*	*3.4*	***-33***	***2.91***
25,26	*33*	*2.9*	*1*	*0.1*	***-32***	***2.81***
27 and over	*10*	*.9*	*0*	*0.0*	***-10***	***0.90***
Accession Category						
4-Year Open, No Bonus	*9*	*.8*	*422*	*37.7*	***413***	***36.88***
4-Year Guar., No Bonus	*63*	*5.6*	*6*	*0.5*	***-57***	***5.06***
4-Year Guar., With Bonus	*216*	*19.3*	*311*	*27.8*	***95***	***8.47***
6-Year Guar., Acc. Promotions, No Bonus	*0*	*0*	*0*	*0.0*	***0***	***0.00***
6-Year Guar., Acc. Promotions, With Bonus	*819*	*73.1*	*381*	*34.0*	***-438***	***39.08***
Unknown	*13*	*1.2*	*0*	*0.0*	***-13***	***1.20***
Waiver Status						
None	*1027*	*91.7*	*1095*	*97.8*	***68***	***6.07***
Felony	*8*	*.7*	*0*	*0.0*	***-8***	***0.70***
Serious Misdemeanor	*20*	*1.8*	*0*	*0.0*	***-20***	***1.80***
Minor Misdemeanor	*38*	*3.4*	*25*	*2.2*	***-13***	***1.17***
OtherWaiver	*27*	*2.4*	*0*	*0.0*	***-27***	***2.40***
Selector AI						
(0 – 9 above selector AI)	*210*	*18.8*	*316*	*28.2*	***106***	***9.41***
(10 – 19 above selector AI)	*206*	*18.4*	*306*	*27.3*	***100***	***8.92***
(20 + above selector AI)	*682*	*60.9*	*407*	*36.3*	***-275***	***24.56***
(Any value below selector AI)	*22*	*2.0*	*91*	*8.1*	***69***	***6.13***
Gender						
Male	*1055*	*94.2*	*673*	*60.1*	***-382***	***34.10***
Female	*65*	*5.8*	*447*	*39.9*	***382***	***34.10***

Race/Ethnicity						
Unknown	*49*	*4.1*	*59*	*5.3*	***10***	***1.20***
Black	*205*	*18.3*	*490*	*43.8*	***285***	***25.50***
White	*759*	*65.1*	*385*	*34.4*	***-374***	***30.70***
Hispanic	*61*	*5.4*	*46*	*4.1*	***-15***	***1.30***
Other/Mixed	*79*	*7.1*	*140*	*12.5*	***61***	***5.40***

AFSC and Title	**Actual**		**Optimized**		**Mean Difference**
	Mean	**SD**	**Mean**	**SD**	
2A6X6 Aircraft Electrical & Environmental Systems					
General Science (GS)	56.45	5.23	49.18	5.65	**-7.27**
Arithmetic Reasoning (AR)	56.02	5.62	45.46	4.90	**-10.56**
Word Knowledge (WK)	54.34	4.29	52.74	3.69	**-1.60**
Paragraph Comprehension (PC)	54.96	4.71	52.53	4.69	**-2.43**
Auto and Shop Information (AS)	51.64	7.32	43.49	5.11	**-8.15**
Math Knowledge (MK)	58.68	5.25	55.92	5.39	**-2.76**
Mechanical Comprehension (MC)	56.96	6.85	47.37	6.40	**-9.59**
Electronics Information (EI)	55.13	6.14	47.71	5.72	**-7.42**

AFSC and Title	Actual		Optimized		Difference	
	N	%	N	%	N	%
2A6X3 Aircrew Egress Systems	**401**		**401**			
Education Level						
Unknown	*111*	*27.7*	*33*	*8.2*	***-78***	***19.47***
Less than High School	*1*	*.2*	*15*	*3.7*	***14***	***3.54***
Alt. Certification	*7*	*1.7*	*14*	*3.5*	***7***	***1.79***
High School Diploma	*255*	*63.6*	*121*	*30.2*	***-134***	***33.43***
High School +	*27*	*6.7*	*218*	*54.4*	***191***	***47.66***
Age at Entry (years)						
17,18	*108*	*26.9*	*125*	*31.2*	***17***	***4.27***
19,20	*157*	*39.2*	*165*	*41.1*	***8***	***1.95***
21,22	*82*	*20.4*	*57*	*14.2*	***-25***	***6.19***
23,24	*33*	*8.2*	*31*	*7.7*	***-2***	***0.47***
25,26	*11*	*2.7*	*18*	*4.5*	***7***	***1.79***
27 and over	*10*	*2.5*	*5*	*1.2*	***-5***	***1.25***
Accession Category						
4-Year Open, No Bonus	*2*	*.5*	*252*	*62.8*	***250***	***62.34***
4-Year Guar., No Bonus	34	8.5	*2*	*0.5*	***-32***	***8.00***
4-Year Guar., With Bonus	39	9.7	*1*	*0.2*	***-38***	***9.50***
6-Year Guar., Acc. Promotions, No Bonus	*0*	*0*	*49*	*12.2*	***49***	***12.20***
6-Year Guar., Acc. Promotions, With Bonus	*319*	*79.6*	*39*	*9.7*	***-280***	***69.90***
Unknown	*7*	*1.7*	*58*	*14.5*	***51***	***12.80***
Waiver Status						
None	*346*	*86.3*	*329*	*82.0*	***-17***	***4.30***
Felony	*2*	*.5*	*2*	*0.5*	***0***	***0.00***
Serious Misdemeanor	*10*	*2.5*	*0*	*0.0*	***-10***	***2.50***
Minor Misdemeanor	*25*	*6.2*	*38*	*9.5*	***13***	***3.30***
OtherWaiver	*18*	*4.5*	*32*	*8.0*	***14***	***3.50***
Selector AI						
(0 – 9 above selector AI)	*115*	*28.7*	*179*	*34.0*	***64***	***5.30***
(10 – 19 above selector AI)	*91*	*22.7*	*180*	*34.0*	***89***	***11.30***
(20 + above selector AI)	*139*	*34.7*	*146*	*27.8*	***7***	***6.90***
(Any value below selector AI)	*56*	*14.0*	*21*	*4.0*	***-35***	***10.00***
Gender						
Male	*395*	*98.5*	*221*	*55.1*	***-174***	***43.40***
Female	*6*	*1.5*	*180*	*44.9*	***174***	***43.40***
Race/Ethnicity						
Unknown	*15*	*3.7*	*27*	*6.7*	***12***	***3.00***

Black	*61*	*15.2*	*142*	*35.4*	***81***	***20.20***
White	*277*	*69.1*	*158*	*39.4*	***-119***	***29.70***
Hispanic	*22*	*5.5*	*22*	*5.5*	***0***	***0.00***
Other/Mixed	*26*	*6.5*	*52*	*13*	***26***	***6.50***

AFSC and Title	**Actual**		**Optimized**		**Mean Difference**
	Mean	**SD**	**Mean**	**SD**	
2A6X3 Aircrew Egress Systems					
General Science (GS)	54.98	5.67	50.03	7.06	**-4.95**
Arithmetic Reasoning (AR)	54.77	5.91	48.13	7.19	**-6.64**
Word Knowledge (WK)	54.87	3.81	52.53	5.09	**-2.34**
Paragraph Comprehension (PC)	55.20	4.48	56.27	4.03	**1.07**
Auto and Shop Information (AS)	54.56	6.75	45.21	7.71	**-9.35**
Math Knowledge (MK)	55.33	6.03	51.84	7.06	**-3.49**
Mechanical Comprehension (MC)	58.63	5.73	52.03	8.22	**-6.60**
Electronics Information (EI)	53.34	6.31	47.10	7.65	**-6.24**

AFSC and Title	Actual		Optimized		Difference	
	N	%	N	%	N	%
2T0X1 Traffic Management	**524**		**524**			
Education Level						
Unknown	*111*	*21.2*	*268*	*51.1*	***157***	***29.90***
Less than High School	*1*	*.2*	*99*	*18.9*	***98***	***18.70***
Alt. Certification	*2*	*.4*	*0*	*0.0*	***-2***	***0.40***
High School Diploma	*381*	*72.7*	*76*	*14.5*	***-305***	***58.20***
High School +	*29*	*5.5*	*81*	*15.5*	***52***	***10.00***
Age at Entry (years)						
17,18	*210*	*40.1*	*344*	*65.6*	***134***	***25.50***
19,20	*211*	*40.3*	*61*	*11.6*	***-150***	***28.70***
21,22	*70*	*13.4*	*29*	*5.5*	***-41***	***7.90***
23,24	*17*	*3.2*	*0*	*0.0*	***-17***	***3.20***
25,26	*13*	*2.5*	*1*	*0.2*	***-12***	***2.30***
27 and over	*3*	*.6*	*89*	*17.0*	***86***	***16.40***
Accession Category						
4-Year Open, No Bonus	*214*	*40.8*	*110*	*21.0*	***-104***	***19.80***
4-Year Guar., No Bonus	*183*	*34.9*	*229*	*43.7*	***46***	***8.80***
4-Year Guar., With Bonus	*26*	*5.0*	*32*	*6.1*	***6***	***1.10***
6-Year Guar., Acc. Promotions, No Bonus	*7*	*1.3*	*53*	*10.1*	***46***	***8.80***
6-Year Guar., Acc. Promotions, With Bonus	*81*	*15.5*	*99*	*18.9*	***18***	***3.40***
Unknown	*13*	*2.5*	*1*	*0.2*	***-12***	***2.30***
Waiver Status						
None	*483*	*92.2*	*484*	*92.4*	***1***	***0.20***
Felony	*2*	*.4*	*37*	*7.1*	***35***	***6.70***
Serious Misdemeanor	*11*	*2.1*	*1*	*0.2*	***-10***	***1.90***
Minor Misdemeanor	*8*	*1.5*	*2*	*0.4*	***-6***	***1.10***
Other Waiver	*20*	*3.8*	*0*	*0.0*	***-20***	***3.80***
Selector AI						
(0 – 9 above selector AI)	*136*	*26.0*	*148*	*28.2*	***12***	***2.20***
(10 – 19 above selector AI)	*231*	*44.1*	*138*	*26.3*	***-93***	***17.80***
(20 + above selector AI)	*154*	*29.4*	*204*	*38.9*	***50***	***9.50***
(Any value below selector AI)	*3*	*.6*	*34*	*6.5*	***31***	***5.90***
Gender						
Male	*283*	*54.0*	*347*	*66.2*	***64***	***12.20***
Female	*241*	*46.0*	*177*	*33.8*	***-64***	***12.20***
Race/Ethnicity						
Unknown	*32*	*6.1*	*23*	*4.4*	***-9***	***1.70***

Black	*224*	*42.7*	*152*	*29*	***-72***	***13.70***
White	*160*	*30.5*	*250*	*47.7*	***90***	***17.20***
Hispanic	*37*	*7.1*	*33*	*6.3*	***-4***	***0.80***
Other/Mixed	*71*	*13.5*	*66*	*12.6*	***-5***	***0.90***

AFSC and Title	**Actual**		**Optimized**		**Mean Difference**
	Mean	**SD**	**Mean**	**SD**	
2T0X1 Traffic Management					
General Science (GS)	48.25	6.40	50.34	6.61	**2.09**
Arithmetic Reasoning (AR)	46.97	5.77	53.48	6.01	**6.51**
Word Knowledge (WK)	49.93	4.71	52.39	4.61	**2.46**
Paragraph Comprehension (PC)	50.84	5.24	51.40	5.87	**0.56**
Auto and Shop Information (AS)	42.54	6.49	45.58	6.72	**3.04**
Math Knowledge (MK)	54.10	5.00	54.44	5.26	**0.34**
Mechanical Comprehension (MC)	45.46	6.63	48.59	7.95	**3.13**
Electronics Information (EI)	45.21	6.68	50.04	7.04	**4.83**

AFSC and Title	Actual		Optimized		Difference	
	N	%	N	%	N	%
3A0X1 Information Management	**1946**		**1946**			
Education Level						
Unknown	*429*	*22.0*	*307*	*15.8*	***-122***	***6.20***
Less than High School	*10*	*.5*	*7*	*0.4*	***-3***	***0.10***
Alt. Certification	*20*	*1.0*	*0*	*0.0*	***-20***	***1.00***
High School Diploma	*1376*	*70.7*	*1489*	*76.5*	***113***	***5.80***
High School +	*111*	*5.7*	*143*	*7.3*	***32***	***1.60***
Age at Entry (years)						
17,18	*938*	*48.2*	*690*	*35.5*	***-248***	***12.70***
19,20	*684*	*35.1*	*762*	*39.2*	***78***	***4.10***
21,22	*192*	*9.9*	*389*	*20.0*	***197***	***10.10***
23,24	*86*	*4.4*	*68*	*3.5*	***-18***	***0.90***
25,26	*26*	*1.3*	*37*	*1.9*	***11***	***0.60***
27 and over	*20*	*1.0*	*0*	*0.0*	***-20***	***1.00***
Accession Category						
4-Year Open, No Bonus	*820*	*42.1*	*1308*	*67.2*	***488***	***25.10***
4-Year Guar., No Bonus	686	35.3	*443*	*22.8*	***-243***	***12.50***
4-Year Guar., With Bonus	76	3.9	*119*	*6.1*	***43***	***2.20***
6-Year Guar., Acc. Promotions, No Bonus	*41*	*2.1*	*36*	*1.8*	***-5***	***0.30***
6-Year Guar., Acc. Promotions, With Bonus	*266*	*13.7*	*40*	*2.1*	***-226***	***11.60***
Unknown	*57*	*2.9*	*0*	*0.0*	***-57***	***2.90***
Waiver Status						
None	*1779*	*91.4*	*1926*	*99.0*	***147***	***7.60***
Felony	*4*	*.2*	*0*	*0.0*	***-4***	***0.20***
Serious Misdemeanor	*15*	*.8*	*0*	*0.0*	***-15***	***0.80***
Minor Misdemeanor	*63*	*3.2*	*18*	*0.9*	***-45***	***2.30***
Other Waiver	*85*	*4.4*	*2*	*0.1*	***-83***	***4.30***
Selector AI						
(0 – 9 above selector AI)	*57*	*2.9*	*387*	*19.9*	***330***	***17.00***
(10 – 19 above selector AI)	*333*	*17.1*	*518*	*26.6*	***185***	***9.50***
(20 + above selector AI)	*1552*	*79.8*	*947*	*48.7*	***-605***	***31.10***
(Any value below selector AI)	*4*	*.2*	*94*	*4.8*	***90***	***4.60***
Gender						
Male	*757*	*38.9*	*707*	*36.6*	***-50***	***2.30***
Female	*1189*	*61.1*	*1239*	*63.7*	***50***	***2.60***
Race/Ethnicity						

Unknown	*146*	*7.5*	*137*	*7*	***-9***	***0.50***
Black	*812*	*41.7*	*908*	*46.7*	***96***	***5.00***
White	*621*	*31.9*	*530*	*27.2*	***-91***	***4.70***
Hispanic	*111*	*5.7*	*105*	*5.4*	***-6***	***0.30***
Other/Mixed	*256*	*13.2*	*266*	*13.7*	***10***	***0.50***

AFSC and Title	**Actual**		**Optimized**		**Mean Difference**
	Mean	**SD**	**Mean**	**SD**	
3A0X1 Information Management					
General Science (GS)	48.50	6.59	49.04	6.27	**0.54**
Arithmetic Reasoning (AR)	47.43	5.85	49.62	5.57	**2.19**
Word Knowledge (WK)	50.18	4.66	51.61	4.19	**1.43**
Paragraph Comprehension (PC)	51.55	5.22	51.08	5.20	**-0.47**
Auto and Shop Information (AS)	41.53	5.84	39.31	4.47	**-2.22**
Math Knowledge (MK)	54.15	5.0	54.39	5.80	**0.24**
Mechanical Comprehension (MC)	45.57	7.11	43.81	6.04	**-1.76**
Electronics Information (EI)	44.61	6.89	41.19	5.38	**-3.42**

AFSC and Title	Actual		Optimized		Difference	
	N	%	N	%	N	%
3S0X1 Personnel	**1280**		**1280**			
Education Level						
Unknown	*256*	*20.0*	*309*	*24.1*	***53***	***4.10***
Less than High School	*6*	*.5*	*0*	*0.0*	***-6***	***0.50***
Alt. Certification	*10*	*.8*	*0*	*0.0*	***-10***	***0.80***
High School Diploma	*915*	*71.5*	*891*	*69.6*	***-24***	***1.90***
High School +	*93*	*7.3*	*80*	*6.3*	***-13***	***1.00***
Age at Entry (years)						
17,18	*614*	*48.0*	*961*	*75.1*	***347***	***27.10***
19,20	*445*	*34.8*	*50*	*3.9*	***-395***	***30.90***
21,22	*143*	*11.2*	*211*	*16.5*	***68***	***5.30***
23,24	*39*	*3.0*	*58*	*4.5*	***19***	***1.50***
25,26	*24*	*1.9*	*0*	*0.0*	***-24***	***1.90***
27 and over	*15*	*1.2*	*0*	*0.0*	***-15***	***1.20***
Accession Category						
4-Year Open, No Bonus	*593*	*46.3*	*241*	*18.8*	***-352***	***27.50***
4-Year Guar., No Bonus	350	27.3	*1005*	*78.5*	***655***	***51.20***
4-Year Guar., With Bonus	*75*	*5.9*	*1*	*0.1*	***-74***	***5.80***
6-Year Guar., Acc. Promotions, No Bonus	*19*	*1.5*	*0*	*0.0*	***-19***	***1.50***
6-Year Guar., Acc. Promotions, With Bonus	*217*	*17.0*	*0*	*0.0*	***-217***	***17.00***
Unknown	*26*	*2.0*	*33*	*2.6*	***7***	***0.60***
Waiver Status						
None	*1194*	*93.3*	*1279*	*99.9*	***85***	***6.60***
Felony	*5*	*.4*	*0*	*0.0*	***-5***	***0.40***
Serious Misdemeanor	*10*	*.8*	*0*	*0.0*	***-10***	***0.80***
Minor Misdemeanor	*37*	*2.9*	*1*	*0.1*	***-36***	***2.80***
Other Waiver	*34*	*2.7*	*0*	*0.0*	***-34***	***2.70***
Selector AI						
(0 – 9 above selector AI)	*245*	*19.1*	*383*	*29.9*	***138***	***10.80***
(10 – 19 above selector AI)	*487*	*38.0*	*456*	*35.6*	***-31***	***2.40***
(20 + above selector AI)	*537*	*42.0*	*393*	*30.7*	***-144***	***11.30***
(Any value below selector AI)	*11*	*.9*	*48*	*3.8*	***37***	***2.90***
Gender						
Male	*425*	*33.2*	*559*	*43.7*	***134***	***10.50***
Female	*855*	*66.8*	*721*	*56.3*	***-134***	***10.50***
Race/Ethnicity						

Unknown	*119*	*9.3*	*67*	*5.2*	***-52***	***4.10***
Black	*541*	*42.3*	*604*	*47.2*	***63***	***4.90***
White	*394*	*30.8*	*351*	*27.4*	***-43***	***3.40***
Hispanic	*64*	*5.0*	*80*	*6.3*	***16***	***1.30***
Other/Mixed	*162*	*12.7*	*178*	*13.9*	***16***	***1.20***

AFSC and Title	**Actual**		**Optimized**		**Mean Difference**
	Mean	**SD**	**Mean**	**SD**	
3S0X1 Personnel					
General Science (GS)	48.57	6.63	48.02	6.09	**-0.55**
Arithmetic Reasoning (AR)	47.79	5.94	46.24	4.97	**-1.55**
Word Knowledge (WK)	50.58	4.65	51.33	3.95	**0.75**
Paragraph Comprehension (PC)	51.90	5.01	53.55	4.17	**1.65**
Auto and Shop Information (AS)	41.53	6.10	40.30	4.74	**-1.23**
Math Knowledge (MK)	55.40	5.04	52.27	4.98	**-3.13**
Mechanical Comprehension (MC)	45.79	7.09	43.81	5.64	**-1.98**
Electronics Information (EI)	44.72	6.76	45.43	5.94	**0.71**

AFSC and Title	Actual		Optimized		Difference	
	N	%	N	%	N	%
3C0X1 Communications-Computer Systems Operators	**1875**		**1875**			
Education Level						
Unknown	*515*	*27.5*	*174*	*9.3*	***-341***	***18.20***
Less than High School	*11*	*.6*	*0*	*0.0*	***-11***	***0.60***
Alt. Certification	*20*	*1.1*	*0*	*0.0*	***-20***	***1.10***
High School Diploma	*1082*	*57.7*	*11464*	*78.1*	***10382***	***20.40***
High School +	*247*	*13.2*	*237*	*2.6*	***-10***	***10.60***
Age at Entry (years)						
17,18	*764*	*40.7*	*362*	*19.3*	***-402***	***21.40***
19,20	*674*	*35.9*	*1345*	*71.7*	***671***	***35.80***
21,22	*251*	*13.4*	*84*	*4.5*	***-167***	***8.90***
23,24	*114*	*6.1*	*58*	*3.1*	***-56***	***3.00***
25,26	*55*	*2.9*	*25*	*1.3*	***-30***	***1.60***
27 and over	*17*	*.9*	*1*	*0.1*	***-16***	***0.80***
Accession Category						
4-Year Open, No Bonus	*173*	*9.2*	*39*	*2.1*	***-134***	***7.10***
4-Year Guar., No Bonus	*616*	*32.9*	*1114*	*59.4*	***498***	***26.50***
4-Year Guar., With Bonus	*326*	*17.4*	*411*	*21.9*	***85***	***4.50***
6-Year Guar., Acc. Promotions, No Bonus	*293*	*15.6*	*166*	*8.9*	***-127***	***6.70***
6-Year Guar., Acc. Promotions, With Bonus	*414*	*22.1*	*53*	*2.8*	***-361***	***19.30***
Unknown	*53*	*2.8*	*92*	*4.9*	***39***	***2.10***
Waiver Status						
None	*1798*	*95.9*	*1728*	*92.2*	***-70***	***3.70***
Felony	*0*	*0*	*0*	*0.0*	***0***	
Serious Misdemeanor	*7*	*.4*	*0*	*0.0*	***-7***	***0.40***
Minor Misdemeanor	*49*	*2.6*	*29*	*1.5*	***-20***	***1.10***
Other Waiver	*21*	*1.1*	*118*	*6.3*	***97***	***5.20***
Selector AI						
(0 – 9 above selector AI)	*420*	*22.4*	*438*	*23.4*	***18***	***1.00***
(10 – 19 above selector AI)	*287*	*15.3*	*519*	*27.7*	***232***	***12.40***
(20 + above selector AI)	*380*	*20.3*	*777*	*41.4*	***397***	***21.10***
(Any value below selector AI)	*788*	*42.0*	*141*	*7.5*	***-647***	***34.50***
Gender						
Male	*1491*	*79.5*	*1466*	*78.2*	***-1162***	***6.70***
Female	*384*	*20.5*	*409*	*21.8*	***-261***	***6.70***

Race/Ethnicity						
Unknown	*122*	*6.5*	*86*	*4.6*	***-103***	***2.30***
Black	*419*	*22.3*	*489*	*26.1*	***-293***	***5.60***
White	*1065*	*56.3*	*1035*	*55.2*	***-815***	***1.00***
Hispanic	*94*	*5.0*	*91*	*4.9*	***-71***	***0.10***
Other/Mixed	*175*	*9.3*	*174*	*9.3*	***-141***	***1.80***

AFSC and Title	**Actual**		**Optimized**		**Mean Difference**
	Mean	**SD**	**Mean**	**SD**	
3C0X1 Communications-Computer Systems Operators					
General Science (GS)	56.34	6.06	53.32	6.77	**-3.02**
Arithmetic Reasoning (AR)	58.24	4.64	56.49	5.95	**-1.75**
Word Knowledge (WK)	55.75	3.82	53.20	4.48	**-2.55**
Paragraph Comprehension (PC)	56.64	3.98	54.13	5.09	**-2.51**
Auto and Shop Information (AS)	48.58	7.43	47.54	6.40	**-1.04**
Math Knowledge (MK)	59.74	5.35	55.40	7.07	**-4.34**
Mechanical Comprehension (MC)	55.67	8.00	52.13	7.63	**-3.54**
Electronics Information (EI)	52.50	7.41	49.77	6.62	**-2.73**

AFSC and Title	Actual		Optimized		Difference	
	N	%	N	%	N	%
3M0X1 Services	**1185**		**1185**			
Education Level						
Unknown	*287*	*24.2*	*275*	*23.2*	***-12***	***1.00***
Less than High School	*8*	*.7*	*0*	*0.0*	***-8***	***0.70***
Alt. Certification	*14*	*1.2*	*10*	*0.8*	***-4***	***0.40***
High School Diploma	*806*	*68.0*	*899*	*75.9*	***93***	***7.90***
High School +	*70*	*5.9*	*1*	*0.1*	***-69***	***5.80***
Age at Entry (years)						
17,18	*553*	*46.7*	*591*	*49.9*	***38***	***3.20***
19,20	*416*	*35.1*	*379*	*32.0*	***-37***	***3.10***
21,22	*138*	*11.6*	*99*	*8.4*	***-39***	***3.20***
23,24	*44*	*3.7*	*105*	*8.9*	***61***	***5.20***
25,26	*25*	*2.1*	*11*	*0.9*	***-14***	***1.20***
27 and over	*9*	*.8*	*0*	*0.0*	***-9***	***0.80***
Accession Category						
4-Year Open, No Bonus	*601*	*50.7*	*169*	*14.3*	***-432***	***36.40***
4-Year Guar., No Bonus	*407*	*34.3*	*434*	*36.6*	***27***	***2.30***
4-Year Guar., With Bonus	*30*	*2.5*	*39*	*3.3*	***9***	***0.80***
6-Year Guar., Acc. Promotions, No Bonus	*8*	*.7*	*0*	*0.0*	***-8***	***0.70***
6-Year Guar., Acc. Promotions, With Bonus	*102*	*8.6*	*543*	*45.8*	***441***	***37.20***
Unknown	*37*	*3.1*	*0*	*0.0*	***-37***	***3.10***
Waiver Status						
None	*1048*	*88.4*	*1153*	*97.3*	***105***	***8.90***
Felony	*3*	*.3*	*0*	*0.0*	***-3***	***0.30***
Serious Misdemeanor	*13*	*1.1*	*0*	*0.0*	***-13***	***1.10***
Minor Misdemeanor	*46*	*3.9*	*0*	*0.0*	***-46***	***3.90***
Other Waiver	*75*	*6.3*	*32*	*2.7*	***-43***	***3.60***
Selector AI						
(0 – 9 above selector AI)	*74*	*6.2*	*379*	*32.0*	***305***	***25.80***
(10 – 19 above selector AI)	*308*	*26.0*	*301*	*25.4*	***-7***	***0.60***
(20 + above selector AI)	*800*	*67.5*	*374*	*31.6*	***-426***	***35.90***
(Any value below selector AI)	*3*	*.3*	*131*	*11.1*	***128***	***10.80***
Gender						
Male	*544*	*45.9*	*814*	*68.7*	***270***	***22.80***
Female	*641*	*54.1*	*371*	*31.3*	***-270***	***22.80***
Race/Ethnicity						

Unknown	*70*	*5.9*	*75*	*6.3*	***5***	***0.40***
Black	*492*	*41.5*	*440*	*37.1*	***-52***	***4.40***
White	*396*	*33.4*	*417*	*35.2*	***21***	***1.80***
Hispanic	*61*	*5.1*	*86*	*7.3*	***25***	***2.20***
Other/Mixed	*166*	*14.0*	*167*	*14.1*	***1***	***0.10***

AFSC and Title	**Actual**		**Optimized**		**Mean Difference**
	Mean	**SD**	**Mean**	**SD**	
3M0X1 Services					
General Science (GS)	48.80	6.53	49.95	6.56	**1.15**
Arithmetic Reasoning (AR)	50.05	5.48	54.46	5.64	**4.41**
Word Knowledge (WK)	51.01	4.65	46.98	4.86	**-4.03**
Paragraph Comprehension (PC)	51.65	5.36	49.37	5.78	**-2.28**
Auto and Shop Information (AS)	42.09	5.95	43.75	5.99	**1.66**
Math Knowledge (MK)	53.29	6.29	59.23	4.70	**5.94**
Mechanical Comprehension (MC)	46.19	7.06	45.34	6.46	**-0.85**
Electronics Information (EI)	45.10	6.73	47.23	6.52	**2.13**

AFSC and Title	Actual		Optimized		Difference	
	N	%	N	%	N	%
6F0X1 Financial Management & Comptroller	**452**		**452**			
Education Level						
Unknown	*118*	*26.1*	*36*	*8.0*	***-82***	***18.10***
Less than High School	*4*	*.9*	*0*	*0.0*	***-4***	***0.90***
Alt. Certification	*3*	*.7*	*0*	*0.0*	***-3***	***0.70***
High School Diploma	*250*	*55.3*	*388*	*85.8*	***138***	***30.50***
High School +	*77*	*17.0*	*28*	*6.2*	***-49***	***10.80***
Age at Entry (years)						
17,18	*139*	*30.8*	*261*	*57.7*	***122***	***26.90***
19,20	*152*	*33.6*	*87*	*19.2*	***-65***	***14.40***
21,22	*82*	*18.1*	*76*	*16.8*	***-6***	***1.30***
23,24	*33*	*7.3*	*23*	*5.1*	***-10***	***2.20***
25,26	*31*	*6.9*	*5*	*1.1*	***-26***	***5.80***
27 and over	*15*	*3.3*	*0*	*0.0*	***-15***	***3.30***
Accession Category						
4-Year Open, No Bonus	*134*	*29.6*	*31*	*6.9*	***-103***	***22.70***
4-Year Guar., No Bonus	*210*	*46.5*	*292*	*64.6*	***82***	***18.10***
4-Year Guar., With Bonus	*14*	*3.1*	*7*	*1.5*	***-7***	***1.60***
6-Year Guar., Acc. Promotions, No Bonus	*7*	*1.5*	*0*	*0.0*	***-7***	***1.50***
6-Year Guar., Acc. Promotions, With Bonus	*68*	*15.0*	*117*	*25.9*	***49***	***10.90***
Unknown	*19*	*4.2*	*5*	*1.1*	***-14***	***3.10***
Waiver Status						
None	*431*	*95.4*	*438*	*96.9*	***7***	***1.50***
Felony	*2*	*.4*	*0*	*0.0*	***-2***	***0.40***
Serious Misdemeanor	*2*	*.4*	*0*	*0.0*	***-2***	***0.40***
Minor Misdemeanor	*10*	*2.2*	*13*	*2.9*	***3***	***0.70***
Other Waiver	*7*	*1.5*	*1*	*0.2*	***-6***	***1.30***
Selector AI						
(0 – 9 above selector AI)	*156*	*34.5*	*100*	*22.1*	***-56***	***12.40***
(10 – 19 above selector AI)	*121*	*26.8*	*83*	*18.4*	***-38***	***8.40***
(20 + above selector AI)	*122*	*27.0*	*222*	*49.1*	***100***	***22.10***
(Any value below selector AI)	*53*	*11.7*	*47*	*10.4*	***-6***	***1.30***
Gender						
Male	*250*	*55.3*	*329*	*72.8*	***79***	***17.50***
Female	*202*	*44.7*	*123*	*27.2*	***-79***	***17.50***
Race/Ethnicity						

Unknown	*25*	*5.5*	*19*	*4.2*	***-6***	***1.30***
Black	*108*	*23.9*	*126*	*27.9*	***18***	***4.00***
White	*247*	*54.6*	*250*	*55.3*	***3***	***0.70***
Hispanic	*23*	*5.1*	*23*	*5.1*	***0***	***0.00***
Other/Mixed	*49*	*10.8*	*34*	*7.5*	***-15***	***3.30***

AFSC and Title	**Actual**		**Optimized**		**Mean Difference**
	Mean	**SD**	**Mean**	**SD**	
6F0X1 Financial Management & Comptroller					
General Science (GS)	54.24	6.37	49.62	5.90	**-4.62**
Arithmetic Reasoning (AR)	56.91	4.94	55.62	4.52	**-1.29**
Word Knowledge (WK)	54.66	4.32	56.10	3.15	**1.44**
Paragraph Comprehension (PC)	55.85	4.40	51.06	5.74	**-4.79**
Auto and Shop Information (AS)	45.94	7.37	48.23	7.02	**2.29**
Math Knowledge (MK)	58.69	5.44	57.22	5.91	**-1.47**
Mechanical Comprehension (MC)	51.97	8.07	51.37	7.40	**-0.60**
Electronics Information (EI)	49.85	7.56	49.28	6.86	**-0.57**

AFSC and Title	Actual		Optimized		Difference	
	N	%	N	%	N	%
3C2X1 Communications-Computer Systems Control	**545**		**545**			
Education Level						
Unknown	*130*	*23.9*	*301*	*55.2*	***171***	***31.30***
Less than High School	*7*	*1.3*	*0*	*0.0*	***-7***	***1.30***
Alt. Certification	*10*	*1.8*	*0*	*0.0*	***-10***	***1.80***
High School Diploma	*318*	*58.3*	*239*	*43.9*	***-79***	***14.40***
High School +	*80*	*14.7*	*5*	*0.9*	***-75***	***13.80***
Age at Entry (years)						
17,18	*209*	*38.3*	*415*	*76.1*	***206***	***37.80***
19,20	*200*	*36.7*	*52*	*9.5*	***-148***	***27.20***
21,22	*73*	*13.4*	*52*	*9.5*	***-21***	***3.90***
23,24	*36*	*6.6*	*7*	*1.3*	***-29***	***5.30***
25,26	*17*	*3.1*	*0*	*0.0*	***-17***	***3.10***
27 and over	*10*	*1.8*	*19*	*3.5*	***9***	***1.70***
Accession Category						
4-Year Open, No Bonus	*10*	*1.8*	*14*	*2.6*	***4***	***0.80***
4-Year Guar., No Bonus	*148*	*27.2*	*255*	*46.8*	***107***	***19.60***
4-Year Guar., With Bonus	*96*	*17.6*	*23*	*4.2*	***-73***	***13.40***
6-Year Guar., Acc. Promotions, No Bonus	*44*	*8.1*	*49*	*9.0*	***5***	***0.90***
6-Year Guar., Acc. Promotions, With Bonus	*230*	*42.2*	*143*	*26.2*	***-87***	***16.00***
Unknown	*17*	*3.1*	*61*	*11.2*	***44***	***8.10***
Waiver Status						
None	*523*	*96.0*	*459*	*84.2*	***-64***	***11.80***
Felony	*0*	*0*	*0*	*0.0*	***0***	***0.00***
Serious Misdemeanor	*1*	*.2*	*36*	*6.6*	***35***	***6.40***
Minor Misdemeanor	*16*	*2.9*	*37*	*6.8*	***21***	***3.90***
Other Waiver	*5*	*.9*	*13*	*2.4*	***8***	***1.50***
Selector AI						
(0 – 9 above selector AI)	*198*	*36.3*	*129*	*23.7*	***-69***	***12.60***
(10 – 19 above selector AI)	*162*	*29.7*	*136*	*25.0*	***-26***	***4.70***
(20 + above selector AI)	*98*	*18.0*	*250*	*45.9*	***152***	***27.90***
(Any value below selector AI)	*87*	*16.0*	*30*	*5.5*	***-57***	***10.50***
Gender						
Male	*495*	*90.8*	*481*	*88.3*	***-14***	***2.50***
Female	*50*	*9.2*	*64*	*11.7*	***14***	***2.50***
Race/Ethnicity						

Unknown	*27*	*5.0*	*15*	*2.8*	***-12***	***2.20***
Black	*112*	*20.6*	*124*	*22.8*	***12***	***2.20***
White	*337*	*61.8*	*349*	*64*	***12***	***2.20***
Hispanic	*25*	*4.6*	*22*	*4*	***-3***	***0.60***
Other/Mixed	*44*	*8.1*	*35*	*6.4*	***-9***	***1.70***

AFSC and Title	**Actual**		**Optimized**		**Mean Difference**
	Mean	**SD**	**Mean**	**SD**	
3C2X1 Communications-Computer Systems Control					
General Science (GS)	58.46	4.99	57.09	4.67	**-1.37**
Arithmetic Reasoning (AR)	58.54	5.45	57.31	5.08	**-1.23**
Word Knowledge (WK)	55.89	4.27	55.86	3.42	**-0.03**
Paragraph Comprehension (PC)	56.65	4.29	54.86	4.69	**-1.79**
Auto and Shop Information (AS)	50.90	7.37	50.37	6.82	**-0.53**
Math Knowledge (MK)	61.16	4.87	59.34	4.58	**-1.82**
Mechanical Comprehension (MC)	57.99	7.12	56.22	6.87	**-1.77**
Electronics Information (EI)	56.00	6.05	57.61	5.00	**1.61**

AFSC and Title	Actual		Optimized		Difference	
	N	%	N	%	N	%
3E0X1 Electrical (Civil Engineering)	**476**		**476**			
Education Level						
Unknown	*126*	*26.5*	*16*	*3.4*	***-110***	***23.10***
Less than High School	*4*	*.8*	*0*	*0.0*	***-4***	***0.80***
Alt. Certification	*3*	*.6*	*91*	*19.1*	***88***	***18.50***
High School Diploma	*316*	*66.4*	*361*	*75.8*	***45***	***9.40***
High School +	*27*	*5.7*	*8*	*1.7*	***-19***	***4.00***
Age at Entry (years)						
17,18	*179*	*37.6*	*85*	*17.9*	***-94***	***19.70***
19,20	*196*	*41.2*	*338*	*71.0*	***142***	***29.80***
21,22	*52*	*10.9*	*17*	*3.6*	***-35***	***7.30***
23,24	*30*	*6.3*	*34*	*7.1*	***4***	***0.80***
25,26	*12*	*2.5*	*1*	*0.2*	***-11***	***2.30***
27 and over	*7*	*1.5*	*1*	*0.2*	***-6***	***1.30***
Accession Category						
4-Year Open, No Bonus	*8*	*1.7*	*312*	*65.5*	***304***	***63.80***
4-Year Guar., No Bonus	*51*	*10.7*	*21*	*4.4*	***-30***	***6.30***
4-Year Guar., With Bonus	*126*	*26.5*	*73*	*15.3*	***-53***	***11.20***
6-Year Guar., Acc. Promotions, No Bonus	*3*	*.6*	*1*	*0.2*	***-2***	***0.40***
6-Year Guar., Acc. Promotions, With Bonus	*276*	*58.0*	*68*	*14.3*	***-208***	***43.70***
Unknown	*12*	*2.5*	*1*	*0.2*	***-11***	***2.30***
Waiver Status						
None	*446*	*93.7*	*413*	*86.8*	***-33***	***6.90***
Felony	*1*	*.2*	*21*	*4.4*	***20***	***4.20***
Serious Misdemeanor	*4*	*.8*	*4*	*0.8*	***0***	***0.00***
Minor Misdemeanor	*5*	*1.1*	*11*	*2.3*	***6***	***1.20***
Other Waiver	*20*	*4.2*	*27*	*5.7*	***7***	***1.50***
Selector AI						
(0 – 9 above selector AI)	*34*	*7.1*	*101*	*21.2*	***67***	***14.10***
(10 – 19 above selector AI)	*155*	*32.6*	*119*	*25.0*	***-36***	***7.60***
(20 + above selector AI)	*287*	*60.3*	*219*	*46.0*	***-68***	***14.30***
(Any value below selector AI)	*0*	*0*	*37*	*7.8*	***37***	***7.80***
Gender						
Male	*464*	*97.5*	*378*	*79.4*	***-86***	***18.10***
Female	*12*	*2.5*	*98*	*20.6*	***86***	***18.10***
Race/Ethnicity						
Unknown	*24*	*5.0*	*31*	*6.5*	***7***	***1.50***

Black	*176*	*37.0*	*142*	*29.8*	***-34***	***7.20***
White	*190*	*39.9*	*233*	*48.9*	***43***	***9.00***
Hispanic	*33*	*6.9*	*21*	*4.4*	***-12***	***2.50***
Other/Mixed	*53*	*11.1*	*49*	*10.3*	***-4***	***0.80***

AFSC and Title	**Actual**		**Optimized**		**Mean Difference**
	Mean	**SD**	**Mean**	**SD**	
3E0X1 Electrical (Civil Engineering)					
General Science (GS)	5072	6.79	52.40	5.91	**1.68**
Arithmetic Reasoning (AR)	49.91	6.47	50.77	5.66	**0.86**
Word Knowledge (WK)	50.15	5.16	52.08	4.51	**1.93**
Paragraph Comprehension (PC)	51.18	5.62	52.66	5.32	**1.48**
Auto and Shop Information (AS)	46.54	7.22	50.19	7.64	**3.65**
Math Knowledge (MK)	55.80	5.65	53.56	5.67	**-2.24**
Mechanical Comprehension (MC)	49.99	7.81	53.51	7.68	**3.52**
Electronics Information (EI)	49.10	7.12	53.32	6.26	**4.22**

AFSC and Title	Actual		Optimized		Difference	
	N	%	N	%	N	%
2E6X3 Voice Network Systems	**288**		**288**			
Education Level						
Unknown	*71*	*24.7*	*31*	*10.8*	***-40***	***13.90***
Less than High School	*4*	*1.4*	*0*	*0.0*	***-4***	***1.40***
Alt. Certification	*3*	*1.0*	*0*	*0.0*	***-3***	***1.00***
High School Diploma	*184*	*63.9*	*244*	*84.7*	***60***	***20.80***
High School +	*26*	*9.0*	*13*	*4.5*	***-13***	***4.50***
Age at Entry (years)						
17,18	*117*	*40.6*	*38*	*13.2*	***-79***	***27.40***
19,20	*98*	*34.0*	*11*	*3.8*	***-87***	***30.20***
21,22	*44*	*15.3*	*166*	*57.6*	***122***	***42.30***
23,24	*21*	*7.3*	*19*	*6.6*	***-2***	***0.70***
25,26	*6*	*2.1*	*13*	*4.5*	***7***	***2.40***
27 and over	*2*	*.7*	*41*	*14.2*	***39***	***13.50***
Accession Category						
4-Year Open, No Bonus	*12*	*4.2*	*85*	*29.5*	***73***	***25.30***
4-Year Guar., No Bonus	44	15.3	*13*	*4.5*	***-31***	***10.80***
4-Year Guar., With Bonus	42	14.6	*35*	*12.2*	***-7***	***2.40***
6-Year Guar., Acc. Promotions, No Bonus	*1*	*.3*	*0*	*0.0*	***-1***	***0.30***
6-Year Guar., Acc. Promotions, With Bonus	*184*	*63.9*	*140*	*48.6*	***-44***	***15.30***
Unknown	*5*	*1.7*	*15*	*5.2*	***10***	***3.50***
Waiver Status						
None	*267*	*92.7*	*134*	*46.5*	***-133***	***46.20***
Felony	*1*	*.3*	*0*	*0.0*	***-1***	***0.30***
Serious Misdemeanor	*3*	*1.0*	*0*	*0.0*	***-3***	***1.00***
Minor Misdemeanor	*10*	*3.5*	*151*	*52.4*	***141***	***48.90***
Other Waiver	*7*	*2.4*	*3*	*1.0*	***-4***	***1.40***
Selector AI						
(0 – 9 above selector AI)	*93*	*32.3*	*80*	*27.8*	***-13***	***4.50***
(10 – 19 above selector AI)	*62*	*21.5*	*60*	*20.8*	***-2***	***0.70***
(20 + above selector AI)	*132*	*45.8*	*120*	*41.7*	***-12***	***4.10***
(Any value below selector AI)	*1*	*.3*	*28*	*9.7*	***27***	***9.40***
Gender						
Male	252	87.5	*227*	*78.8*	***-25***	***8.70***
Female	*36*	*12.5*	*61*	*21.2*	***25***	***8.70***
Race/Ethnicity						
Unknown	*15*	*5.2*	*18*	*6.3*	***3***	***1.10***

Black	*89*	*30.9*	*68*	*23.6*	***-21***	***7.30***
White	*144*	*50.0*	*174*	*60.4*	***30***	***10.40***
Hispanic	*13*	*4.5*	*6*	*2.1*	***-7***	***2.40***
Other/Mixed	*27*	*9.4*	*22*	*7.6*	***-5***	***1.80***

AFSC and Title	Actual		Optimized		Mean Difference
	Mean	SD	Mean	SD	
2E6X3 Voice Network Systems					
General Science (GS)	53.96	6.25	53.34	5.43	**-0.62**
Arithmetic Reasoning (AR)	52.13	6.67	53.79	5.80	**1.66**
Word Knowledge (WK)	51.68	5.04	54.82	3.72	**3.14**
Paragraph Comprehension (PC)	52.91	5.37	51.10	6.07	**-1.81**
Auto and Shop Information (AS)	47.61	7.19	52.97	7.18	**5.36**
Math Knowledge (MK)	57.24	5.22	54.15	5.76	**-3.09**
Mechanical Comprehension (MC)	51.76	8.11	53.01	7.50	**1.25**
Electronics Information (EI)	52.24	6.68	51.95	5.78	**-0.29**

AFSC and Title	Actual		Optimized		Difference	
	N	%	N	%	N	%
2T1X1 Vehicle Operations	**679**		**679**			
Education Level						***0.00***
Unknown	*192*	*27.5*	*521*	*74.7*	***329***	***47.20***
Less than High School	*6*	*.9*	*0*	*0.0*	***-6***	***0.90***
Alt. Certification	*12*	*1.7*	*0*	*0.0*	***-12***	***1.70***
High School Diploma	*458*	*65.7*	*165*	*23.7*	***-293***	***42.00***
High School +	*29*	*4.2*	*11*	*1.6*	***-18***	***2.60***
Age at Entry (years)						
17,18	*261*	*37.4*	*377*	*54.1*	***116***	***16.70***
19,20	*277*	*39.7*	*189*	*27.1*	***-88***	***12.60***
21,22	*94*	*13.9*	*91*	*13.1*	***-3***	***0.80***
23,24	*41*	*5.9*	*33*	*4.7*	***-8***	***1.20***
25,26	*17*	*2.4*	*1*	*0.1*	***-16***	***2.30***
27 and over	*7*	*1.0*	*6*	*0.9*	***-1***	***0.10***
Accession Category						
4-Year Open, No Bonus	*43*	*6.2*	*57*	*8.2*	***14***	***2.00***
4-Year Guar., No Bonus	*59*	*8.5*	*632*	*90.7*	***573***	***82.20***
4-Year Guar., With Bonus	*123*	*17.6*	*3*	*0.4*	***-120***	***17.20***
6-Year Guar., Acc. Promotions, No Bonus	*3*	*.4*	*0*	*0.0*	***-3***	***0.40***
6-Year Guar., Acc. Promotions, With Bonus	*452*	*64.8*	*5*	*0.7*	***-447***	***64.10***
Unknown	*17*	*2.4*	*0*	*0.0*	***-17***	***2.40***
Waiver Status						
None	*620*	*89.0*	*677*	*97.1*	***57***	***8.10***
Felony	*5*	*.7*	*0*	*0.0*	***-5***	***0.70***
Serious Misdemeanor	*9*	*1.3*	*0*	*0.0*	***-9***	***1.30***
Minor Misdemeanor	*22*	*3.2*	*17*	*2.4*	***-5***	***0.80***
Other Waiver	*41*	*5.9*	*3*	*0.4*	***-38***	***5.50***
Selector AI						
(0 – 9 above selector AI)	*350*	*50.2*	*220*	*31.6*	***-130***	***18.60***
(10 – 19 above selector AI)	*87*	*12.5*	*192*	*27.5*	***105***	***15.00***
(20 + above selector AI)	*135*	*19.4*	*246*	*35.3*	***111***	***15.90***
(Any value below selector AI)	*125*	*17.9*	*39*	*5.6*	***-86***	***12.30***
Gender						
Male	*557*	*79.9*	*478*	*68.6*	***-79***	***11.30***
Female	*140*	*20.1*	*219*	*31.4*	***79***	***11.30***
Race/Ethnicity						
Unknown	*37*	*5.3*	*22*	*3.2*	***-15***	***2.10***

Black	*173*	*24.8*	*226*	*32.4*	***53***	***7.60***
White	*398*	*57.1*	*332*	*47.6*	***-66***	***9.50***
Hispanic	*28*	*4.0*	*52*	*7.5*	***24***	***3.50***
Other/Mixed	*61*	*8.8*	*65*	*9.3*	***4***	***0.50***

AFSC and Title	**Actual**		**Optimized**		**Mean Difference**
	Mean	**SD**	**Mean**	**SD**	
2T1X1 Vehicle Operations					
General Science (GS)	50.76	5.98	52.81	6.52	**2.05**
Arithmetic Reasoning (AR)	49.14	6.11	50.50	6.89	**1.36**
Word Knowledge (WK)	51.91	4.19	51.46	4.66	**-0.45**
Paragraph Comprehension (PC)	52.35	5.26	54.96	4.37	**2.61**
Auto and Shop Information (AS)	49.19	6.51	45.10	6.71	**-4.09**
Math Knowledge (MK)	52.48	6.35	53.79	6.39	**1.31**
Mechanical Comprehension (MC)	51.96	6.26	54.80	7.01	**2.84**
Electronics Information (EI)	48.83	6.58	47.23	7.20	**-1.60**

AFSC and Title	Actual		Optimized		Difference	
	N	%	N	%	N	%
1C1X1 Air Traffic Control	**899**		**899**			
Education Level						
Unknown	*232*	*25.8*	*515*	*57.3*	***283***	***31.50***
Less than High School	*6*	*.7*	*0*	*0.0*	***-6***	***0.70***
Alt. Certification	*10*	*1.1*	*10*	*1.1*	***0***	***0.00***
High School Diploma	*547*	*60.8*	*354*	*39.4*	***-193***	***21.40***
High School +	*104*	*11.6*	*20*	*2.2*	***-84***	***9.40***
Age at Entry (years)						
17,18	*336*	*37.4*	*427*	*47.5*	***91***	***10.10***
19,20	*325*	*36.2*	*252*	*28.0*	***-73***	***8.20***
21,22	*147*	*16.4*	*163*	*18.1*	***16***	***1.70***
23,24	*64*	*7.1*	*27*	*3.0*	***-37***	***4.10***
25,26	*16*	*1.8*	*15*	*1.7*	***-1***	***0.10***
27 and over	*11*	*1.2*	*15*	*1.7*	***4***	***0.50***
Accession Category						
4-Year Open, No Bonus	*17*	*1.9*	*0*	*0.0*	***-17***	***1.90***
4-Year Guar., No Bonus	258	28.7	*59*	*6.6*	***-199***	***22.10***
4-Year Guar., With Bonus	*87*	*9.7*	*46*	*5.1*	***-41***	***4.60***
6-Year Guar., Acc. Promotions, No Bonus	*47*	*5.2*	*339*	*37.7*	***292***	***32.50***
6-Year Guar., Acc. Promotions, With Bonus	*468*	*52.1*	*347*	*38.6*	***-121***	***13.50***
Unknown	*22*	*2.4*	*108*	*12.0*	***86***	***9.60***
Waiver Status						
None	*841*	*93.5*	*897*	*99.8*	***56***	***6.30***
Felony	*1*	*.1*	*0*	*0.0*	***-1***	***0.10***
Serious Misdemeanor	*19*	*2.1*	*0*	*0.0*	***-19***	***2.10***
Minor Misdemeanor	*24*	*2.7*	*2*	*0.2*	***-22***	***2.50***
Other Waiver	*14*	*1.6*	*0*	*0.0*	***-14***	***1.60***
Selector AI						
(0 – 9 above selector AI)	*171*	*19.0*	*315*	*35.0*	***144***	***16.00***
(10 – 19 above selector AI)	*158*	*17.6*	*222*	*24.7*	***64***	***7.10***
(20 + above selector AI)	*212*	*23.6*	*304*	*33.8*	***92***	***10.20***
(Any value below selector AI)	*358*	*39.8*	*58*	*6.5*	***-300***	***33.30***
Gender						
Male	*574*	*63.8*	*698*	*77.6*	***124***	***13.80***
Female	*325*	*36.2*	*201*	*22.4*	***-124***	***13.80***
Race/Ethnicity						***0.00***
Unknown	*29*	*3.2*	*36*	*4*	***7***	***0.80***

Black	*261*	*29.0*	*251*	*27.9*	***-10***	***1.10***
White	*475*	*52.8*	*476*	*52.9*	***1***	***0.10***
Hispanic	*43*	*4.8*	*46*	*5.1*	***3***	***0.30***
Other/Mixed	*91*	*10.1*	*90*	*10*	***-1***	***0.10***

AFSC and Title	Actual		Optimized		Mean Difference
	Mean	SD	Mean	SD	
1C1X1 Air Traffic Control					
General Science (GS)	54.59	6.32	50.93	6.80	**-3.66**
Arithmetic Reasoning (AR)	56.87	5.06	53.69	6.99	**-3.18**
Word Knowledge (WK)	54.72	3.79	51.81	4.92	**-2.91**
Paragraph Comprehension (PC)	56.08	4.18	53.08	5.32	**-3.00**
Auto and Shop Information (AS)	47.66	7.41	50.42	7.64	**2.76**
Math Knowledge (MK)	58.75	5.68	59.56	5.48	**0.81**
Mechanical Comprehension (MC)	53.65	7.71	48.57	8.16	**-5.08**
Electronics Information (EI)	50.07	6.75	49.84	7.53	**-0.23**

AFSC and Title	Actual		Optimized		Difference	
	N	%	N	%	N	%
2W0X1 Munitions Systems	**2040**		**2040**			
Education Level						
Unknown	*501*	*24.6*	*654*	*32.1*	***153***	***7.50***
Less than High School	*19*	*.9*	*2*	*0.1*	***-17***	***0.80***
Alt. Certification	*32*	*1.6*	*0*	*0.0*	***-32***	***1.60***
High School Diploma	*1308*	*64.1*	*1101*	*54.0*	***-207***	***10.10***
High School +	*180*	*8.8*	*283*	*13.9*	***103***	***5.10***
Age at Entry (years)						
17,18	*669*	*32.8*	*966*	*47.7*	***297***	***14.90***
19,20	*773*	*37.9*	*682*	*33.4*	***-91***	***4.50***
21,22	*353*	*17.3*	*132*	*6.5*	***-221***	***10.80***
23,24	*135*	*6.6*	*235*	*11.5*	***100***	***4.90***
25,26	*73*	*3.6*	*23*	*1.1*	***-50***	***2.50***
27 and over	*37*	*1.8*	*2*	*0.1*	***-35***	***1.70***
Accession Category						
4-Year Open, No Bonus	*17*	*.8*	*0*	*0.0*	***-17***	***0.80***
4-Year Guar., No Bonus	*83*	*4.1*	*0*	*0.0*	***-83***	***4.10***
4-Year Guar., With Bonus	*209*	*10.2*	*625*	*30.6*	***416***	***20.40***
6-Year Guar., Acc. Promotions, No Bonus	*2*	*.1*	*0*	*0.0*	***-2***	***0.10***
6-Year Guar., Acc. Promotions, With Bonus	*1712*	*83.9*	*1415*	*69.4*	***-297***	***14.50***
Unknown	*17*	*.8*	*0*	*0.0*	***-17***	***0.80***
Waiver Status						
None	*1806*	*88.5*	*1701*	*83.4*	***-105***	***5.10***
Felony	*23*	*1.1*	*0*	*0.0*	***-23***	***1.10***
Serious Misdemeanor	*50*	*2.5*	*0*	*0.0*	***-50***	***2.50***
Minor Misdemeanor	*91*	*4.5*	*131*	*6.4*	***40***	***1.90***
Other Waiver	*70*	*3.4*	*208*	*10.2*	***138***	***6.80***
Selector AI						
(0 – 9 above selector AI)	*498*	*24.4*	*1085*	*53.2*	***587***	***28.80***
(10 – 19 above selector AI)	*390*	*19.1*	*538*	*26.4*	***148***	***7.30***
(20 + above selector AI)	*487*	*23.9*	*289*	*14.2*	***-198***	***9.70***
(Any value below selector AI)	*665*	*32.6*	*128*	*6.3*	***-537***	***26.30***
Gender						
Male	*1784*	*87.5*	*1535*	*75.2*	***-249***	***12.30***
Female	*256*	*12.5*	*505*	*24.8*	***249***	***12.30***
Race/Ethnicity						

Unknown	*58*	*2.8*	*84*	*4.1*	***26***	***1.30***
Black	*347*	*17.0*	*752*	*36.9*	***405***	***19.90***
White	*1444*	*70.8*	*870*	*42.6*	***-574***	***28.20***
Hispanic	*72*	*3.5*	*109*	*5.3*	***37***	***1.80***
Other/Mixed	*119*	*5.8*	*225*	*11*	***106***	***5.20***

AFSC and Title	Actual		Optimized		Mean Difference
	Mean	SD	Mean	SD	
2W0X1 Munitions Systems					
General Science (GS)	55.39	5.94	49.60	5.64	**-5.79**
Arithmetic Reasoning (AR)	55.65	5.80	48.93	5.44	**-6.72**
Word Knowledge (WK)	54.94	3.90	50.55	4.35	**-4.39**
Paragraph Comprehension (PC)	55.47	4.46	51.76	5.03	**-3.71**
Auto and Shop Information (AS)	52.51	7.82	45.28	7.22	**-7.23**
Math Knowledge (MK)	56.65	6.45	51.90	6.02	**-4.75**
Mechanical Comprehension (MC)	56.75	7.49	48.14	7.36	**-8.61**
Electronics Information (EI)	52.80	6.79	46.16	6.65	**-6.64**

AFSC and Title	Actual		Optimized		Difference	
	N	%	N	%	N	%
1C0X2 Aviation Resource Management	**354**		**354**			
Education Level						
Unknown	*83*	*23.4*	*43*	*12.1*	***-40***	***11.30***
Less than High School	*0*	*0*	*1*	*0.3*	***1***	***0.30***
Alt. Certification	*1*	*.3*	*0*	*0.0*	***-1***	***0.30***
High School Diploma	*235*	*66.4*	*295*	*83.3*	***60***	***16.90***
High School +	*35*	*9.9*	*15*	*4.2*	***-20***	***5.70***
Age at Entry (years)						
17,18	*159*	*44.9*	*230*	*65.0*	***71***	***20.10***
19,20	*135*	*38.1*	*88*	*24.9*	***-47***	***13.20***
21,22	*32*	*9.0*	*4*	*1.1*	***-28***	***7.90***
23,24	*10*	*2.8*	*20*	*5.6*	***10***	***2.80***
25,26	*9*	*2.5*	*0*	*0.0*	***-9***	***2.50***
27 and over	*9*	*2.5*	*12*	*3.4*	***3***	***0.90***
Accession Category						
4-Year Open, No Bonus	*166*	*46.9*	*65*	*18.4*	***-101***	***28.50***
4-Year Guar., No Bonus	*119*	*33.6*	*153*	*43.2*	***34***	***9.60***
4-Year Guar., With Bonus	*10*	*2.8*	*5*	*1.4*	***-5***	***1.40***
6-Year Guar., Acc. Promotions, No Bonus	*6*	*1.7*	*12*	*3.4*	***6***	***1.70***
6-Year Guar., Acc. Promotions, With Bonus	*40*	*11.3*	*38*	*10.7*	***-2***	***0.60***
Unknown	*13*	*3.7*	*81*	*22.9*	***68***	***19.20***
Waiver Status						
None	*336*	*94.9*	*245*	*69.2*	***-91***	***25.70***
Felony	*0*	*0*	*1*	*0.3*	***1***	***0.30***
Serious Misdemeanor	*4*	*1.1*	*0*	*0.0*	***-4***	***1.10***
Minor Misdemeanor	*10*	*2.8*	*6*	*1.7*	***-4***	***1.10***
Other Waiver	*4*	*1.1*	*102*	*28.8*	***98***	***27.70***
Selector AI						
(0 – 9 above selector AI)	*62*	*17.5*	*79*	*22.3*	***17***	***4.80***
(10 – 19 above selector AI)	*133*	*37.6*	*78*	*22.0*	***-55***	***15.60***
(20 + above selector AI)	*157*	*44.4*	*161*	*45.5*	***4***	***1.10***
(Any value below selector AI)	*2*	*.6*	*36*	*10.2*	***34***	***9.60***
Gender						
Male	*103*	*29.1*	*204*	*57.6*	***101***	***28.50***
Female	*251*	*70.9*	*105*	*42.4*	***-146***	***28.50***
Race/Ethnicity						
Unknown	*26*	*7.3*	*23*	*6.5*	***-3***	***0.80***

Black	*145*	*41.0*	*130*	*36.7*	***-15***	***4.30***
White	*124*	*35.0*	*132*	*37.3*	***8***	***2.30***
Hispanic	*18*	*5.1*	*25*	*7.1*	***7***	***2.00***
Other/Mixed	*41*	*11.6*	*44*	*12.4*	***3***	***0.80***

AFSC and Title	**Actual**		**Optimized**		**Mean Difference**
	Mean	**SD**	**Mean**	**SD**	
1C0X2 Aviation Resource Management					
General Science (GS)	48.49	6.9	47.04	6.66	**-1.45**
Arithmetic Reasoning (AR)	46.79	5.73	53.45	6.23	**6.66**
Word Knowledge (WK)	50.38	4.25	50.72	4.50	**0.34**
Paragraph Comprehension (PC)	51.22	5.14	55.00	4.20	**3.78**
Auto and Shop Information (AS)	41.18	5.94	43.65	6.87	**2.47**
Math Knowledge (MK)	55.46	4.63	56.31	4.21	**0.85**
Mechanical Comprehension (MC)	45.45	7.19	51.58	7.83	**6.13**
Electronics Information (EI)	43.87	6.79	45.75	6.86	**1.88**

AFSC and Title	Actual		Optimized		Difference	
	N	%	N	%	N	%
3C1X1 Radio Communication Systems	**218**		**218**			
Education Level						
Unknown	*31*	*14.2*	*81*	*37.2*	***50***	***23.00***
Less than High School	*0*	*0*	*0*	*0.0*	***0***	***0.00***
Alt. Certification	*2*	*.9*	*0*	*0.0*	***-2***	***0.90***
High School Diploma	*173*	*79.4*	*136*	*62.4*	***-37***	***17.00***
High School +	*12*	*5.5*	*1*	*0.5*	***-11***	***5.00***
Age at Entry (years)						
17,18	*103*	*47.2*	*67*	*30.7*	***-36***	***16.50***
19,20	*80*	*36.7*	*100*	*45.9*	***20***	***9.20***
21,22	*17*	*7.8*	*38*	*17.4*	***21***	***9.60***
23,24	*7*	*3.2*	*0*	*0.0*	***-7***	***3.20***
25,26	*7*	*3.2*	*10*	*4.6*	***3***	***1.40***
27 and over	*4*	*1.8*	*3*	*1.4*	***-1***	***0.40***
Accession Category						
4-Year Open, No Bonus	*100*	*45.9*	*7*	*3.2*	***-93***	***42.70***
4-Year Guar., No Bonus	*81*	*37.2*	*148*	*67.9*	***67***	***30.70***
4-Year Guar., With Bonus	*9*	*4.1*	*4*	*1.8*	***-5***	***2.30***
6-Year Guar., Acc. Promotions, No Bonus	*5*	*2.3*	*0*	*0.0*	***-5***	***2.30***
6-Year Guar., Acc. Promotions, With Bonus	*18*	*8.3*	*58*	*26.6*	***40***	***18.30***
Unknown	*5*	*2.3*	*1*	*0.5*	***-4***	***1.80***
Waiver Status						
None	*208*	*95.4*	*159*	*72.9*	***-49***	***22.50***
Felony	*0*	*0*	*0*	*0.0*	***0***	***0.00***
Serious Misdemeanor	*1*	*.5*	*0*	*0.0*	***-1***	***0.50***
Minor Misdemeanor	*5*	*2.3*	*59*	*27.1*	***54***	***24.80***
Other Waiver	*4*	*1.8*	*0*	*0.0*	***-4***	***1.80***
Selector AI						
(0 – 9 above selector AI)	*48*	*22.0*	*102*	*46.8*	***54***	***24.80***
(10 – 19 above selector AI)	*87*	*39.9*	*68*	*31.2*	***-19***	***8.70***
(20 + above selector AI)	*82*	*37.6*	*31*	*14.2*	***-51***	***23.40***
(Any value below selector AI)	*1*	*.5*	*17*	*7.8*	***16***	***7.30***
Gender						
Male	*130*	*59.6*	*142*	*65.1*	***12***	***5.50***
Female	*88*	*40.4*	*76*	*34.9*	***-12***	***5.50***
Race/Ethnicity						
Unknown	*12*	*5.5*	*18*	*8.3*	***6***	***2.80***

Black	*104*	*47.7*	*69*	*31.7*	***-35***	***16.00***
White	*60*	*27.5*	*82*	*37.6*	***22***	***10.10***
Hispanic	*7*	*3.2*	*16*	*7.3*	***9***	***4.10***
Other/Mixed	*35*	*16.1*	*33*	*15.1*	***-2***	***1.00***

AFSC and Title	**Actual**		**Optimized**		**Mean Difference**
	Mean	**SD**	**Mean**	**SD**	
3C1X1 Radio Communication Systems					
General Science (GS)	48.35	7.12	45.74	6.75	**-2.61**
Arithmetic Reasoning (AR)	47.01	6.23	51.24	5.41	**4.23**
Word Knowledge (WK)	50.41	4.47	48.10	5.67	**-2.31**
Paragraph Comprehension (PC)	51.02	5.02	49.11	6.83	**-1.91**
Auto and Shop Information (AS)	41.95	6.15	44.10	6.39	**2.15**
Math Knowledge (MK)	55.30	4.94	51.31	6.81	**-3.99**
Mechanical Comprehension (MC)	46.16	7.50	49.83	7.12	**3.67**
Electronics Information (EI)	44.87	7.08	42.31	6.77	**-2.56**

AFSC and Title	Actual		Optimized		Difference	
	N	%	N	%	N	%
1C7X1 Airfield Management	**184**		**184**			
Education Level						
Unknown	*43*	*23.4*	*36*	*19.6*	***-7***	***3.80***
Less than High School	*0*	*0*	*0*	*0.0*	***0***	***0.00***
Alt. Certification	*0*	*0*	*50*	*27.2*	***50***	***27.20***
High School Diploma	*128*	*69.6*	*80*	*43.5*	***-48***	***26.10***
High School +	*13*	*7.1*	*18*	*9.8*	***5***	***2.70***
Age at Entry (years)						
17,18	*90*	*48.9*	*84*	*45.7*	***-6***	***3.20***
19,20	*66*	*35.9*	*98*	*53.3*	***32***	***17.40***
21,22	*18*	*9.8*	*2*	*0.0*	***-16***	***9.80***
23,24	*9*	*4.9*	*0*	*0.5*	***-9***	***4.40***
25,26	*1*	*.5*	*0*	*0.0*	***-1***	***0.50***
27 and over	*0*	*0*	*0*	*0.0*	***0***	***0.00***
Accession Category						
4-Year Open, No Bonus	*65*	*35.3*	*20*	*10.9*	***-45***	***24.40***
4-Year Guar., No Bonus	*60*	*32.6*	*127*	*69.0*	***67***	***36.40***
4-Year Guar., With Bonus	*8*	*4.3*	*12*	*6.5*	***4***	***2.20***
6-Year Guar., Acc. Promotions, No Bonus	*6*	*3.3*	*0*	*0.0*	***-6***	***3.30***
6-Year Guar., Acc. Promotions, With Bonus	*38*	*20.7*	*21*	*11.4*	***-17***	***9.30***
Unknown	*7*	*3.8*	*4*	*2.2*	***-3***	***1.60***
Waiver Status						
None	*174*	*94.6*	*172*	*93.5*	***-2***	***1.10***
Felony	*0*	*0*	*0*	*0.0*	***0***	***0.00***
Serious Misdemeanor	*0*	*0*	*0*	*0.0*	***0***	***0.00***
Minor Misdemeanor	*7*	*3.8*	*12*	*6.5*	***5***	***2.70***
Other Waiver	*3*	*1.6*	*0*	*0.0*	***-3***	***1.60***
Selector AI						
(0 – 9 above selector AI)	*36*	*19.6*	*57*	*31.0*	***21***	***11.40***
(10 – 19 above selector AI)	*66*	*35.9*	*52*	*28.3*	***-14***	***7.60***
(20 + above selector AI)	*80*	*43.5*	*62*	*33.7*	***-18***	***9.80***
(Any value below selector AI)	*2*	*1.1*	*13*	*7.1*	***11***	***6.00***
Gender						
Male	*69*	*37.5*	*89*	*48.4*	***-7***	***10.90***
Female	*115*	*62.5*	*95*	*51.6*	***-20***	***10.90***
Race/Ethnicity						
Unknown	*8*	*4.3*	*13*	*7.1*	***5***	***2.80***

Black	*66*	*35.9*	*80*	*43.5*	***14***	***7.60***
White	*84*	*45.7*	*54*	*29.3*	***-30***	***16.40***
Hispanic	*16*	*8.7*	*6*	*3.3*	***-10***	***5.40***
Other/Mixed	*10*	*5.4*	*31*	*16.8*	***21***	***11.40***

AFSC and Title	**Actual**		**Optimized**		**Mean Difference**
	Mean	**SD**	**Mean**	**SD**	
1C7X1 Airfield Management					
General Science (GS)	48.70	6.36	46.57	6.25	**-2.13**
Arithmetic Reasoning (AR)	47.74	6.56	45.33	4.94	**-2.41**
Word Knowledge (WK)	50.61	4.56	54.42	3.86	**3.81**
Paragraph Comprehension (PC)	51.82	5.30	53.88	4.58	**2.06**
Auto and Shop Information (AS)	42.17	5.90	40.71	4.96	**-1.46**
Math Knowledge (MK)	55.54	5.19	49.03	5.00	**-6.51**
Mechanical Comprehension (MC)	45.59	7.29	46.63	6.93	**1.04**
Electronics Information (EI)	44.67	6.59	46.89	5.72	**2.22**

AFSC and Title	Actual		Optimized		Difference	
	N	%	N	%	N	%
3P0X1 Security Forces	**7770**		**7770**			
Education Level						
Unknown	*2082*	*26.8*	*2150*	*27.7*	***68***	***0.90***
Less than High School	*39*	*.5*	*1*	*0.0*	***-38***	***0.50***
Alt. Certification	*148*	*1.9*	*0*	*0.0*	***-148***	***1.90***
High School Diploma	*5129*	*66.0*	*5139*	*66.1*	***10***	***0.10***
High School +	*372*	*4.8*	*480*	*6.2*	***108***	***1.40***
Age at Entry (years)						
17,18	*3640*	*46.8*	*3434*	*44.2*	***-206***	***2.60***
19,20	*2937*	*37.8*	*2875*	*37.0*	***-62***	***0.80***
21,22	*803*	*10.3*	*1037*	*13.3*	***234***	***3.00***
23,24	*271*	*3.5*	*300*	*3.9*	***29***	***0.40***
25,26	*87*	*1.1*	*122*	*1.6*	***35***	***0.50***
27 and over	*32*	*.4*	*2*	*0.0*	***-30***	***0.40***
Accession Category						
4-Year Open, No Bonus	*410*	*5.3*	*105*	*1.4*	***-305***	***3.90***
4-Year Guar., No Bonus	*2291*	*29.5*	*437*	*5.6*	***-1854***	***23.90***
4-Year Guar., With Bonus	*667*	*8.6*	*383*	*4.9*	***-284***	***3.70***
6-Year Guar., Acc. Promotions, No Bonus	*405*	*5.2*	*177*	*2.3*	***-228***	***2.90***
6-Year Guar., Acc. Promotions, With Bonus	*3795*	*48.8*	*6668*	*85.8*	***2873***	***37.00***
Unknown	*202*	*2.6*	*0*	*0.0*	***-202***	***2.60***
Waiver Status						
None	*7382*	*95.0*	*7561*	*97.3*	***179***	***2.30***
Felony	*0*	*0*	*0*	*0.0*	***0***	***0.00***
Serious Misdemeanor	*4*	*.1*	*174*	*2.2*	***170***	***2.10***
Minor Misdemeanor	*159*	*2.0*	*27*	*0.3*	***-132***	***1.70***
Other Waiver	*225*	*2.9*	*8*	*0.1*	***-217***	***2.80***
Selector AI						
(0 – 9 above selector AI)	*2981*	*38.4*	*1713*	*22.0*	***-1268***	***16.40***
(10 – 19 above selector AI)	*2099*	*27.0*	*1732*	*22.3*	***-367***	***4.70***
(20 + above selector AI)	*2654*	*34.2*	*3524*	*45.4*	***870***	***11.20***
(Any value below selector AI)	*36*	*.5*	*801*	*10.3*	***765***	***9.80***
Gender						
Male	*6078*	*78.2*	*6711*	*86.4*	***633***	***8.20***
Female	*1692*	*21.8*	*1059*	*13.6*	***-633***	***8.20***
Race/Ethnicity						

Unknown	*240*	*3.1*	*280*	*3.6*	***40***	***0.50***
Black	*2672*	*34.4*	*1414*	*18.2*	***-1258***	***16.20***
White	*3608*	*46.4*	*5225*	*67.2*	***1617***	***20.80***
Hispanic	*430*	*5.5*	*359*	*4.6*	***-71***	***0.90***
Other/Mixed	*820*	*10.6*	*492*	*6.3*	***-328***	***4.30***

AFSC and Title	Actual		Optimized		Mean Difference
	Mean	SD	Mean	SD	
3P0X1 Security Forces					
General Science (GS)	50.57	6.70	56.29	5.44	**5.72**
Arithmetic Reasoning (AR)	50.25	5.69	54.66	5.97	**4.41**
Word Knowledge (WK)	51.68	4.56	54.84	3.82	**3.16**
Paragraph Comprehension (PC)	52.32	5.22	55.69	4.20	**3.37**
Auto and Shop Information (AS)	46.08	7.27	51.18	7.33	**5.10**
Math Knowledge (MK)	53.12	6.09	56.93	6.15	**3.81**
Mechanical Comprehension (MC)	49.46	7.79	56.65	6.92	**7.19**
Electronics Information (EI)	47.48	7.05	53.09	6.51	**5.61**

AFSC and Title	Actual		Optimized		Difference	
	N	%	N	%	N	%
1N0X1 Operations Intelligence	**499**		**499**			
Education Level						
Unknown	*139*	*27.9*	*65*	*13.0*	***-74***	***14.90***
Less than High School	*2*	*.4*	*0*	*0.0*	***-2***	***0.40***
Alt. Certification	*8*	*1.6*	*0*	*0.0*	***-8***	***1.60***
High School Diploma	*289*	*57.9*	*394*	*79.0*	***105***	***21.10***
High School +	*61*	*12.2*	*40*	*8.0*	***-21***	***4.20***
Age at Entry (years)						
17,18	*226*	*45.3*	*132*	*26.5*	***-94***	***18.80***
19,20	*174*	*34.9*	*134*	*26.9*	***-40***	***8.00***
21,22	*64*	*12.8*	*95*	*19.0*	***31***	***6.20***
23,24	*22*	*4.4*	*30*	*6.0*	***8***	***1.60***
25,26	*10*	*2.0*	*108*	*21.6*	***98***	***19.60***
27 and over	*3*	*0.6*	*0*	*0.0*	***-3***	***0.60***
Accession Category						
4-Year Open, No Bonus	*53*	*10.6*	*146*	*29.3*	***93***	***18.70***
4-Year Guar., No Bonus	*62*	*12.4*	*27*	*5.4*	***-35***	***7.00***
4-Year Guar., With Bonus	*87*	*17.4*	*89*	*17.8*	***2***	***0.40***
6-Year Guar., Acc. Promotions, No Bonus	*4*	*.8*	*0*	*0.0*	***-4***	***0.80***
6-Year Guar., Acc. Promotions, With Bonus	*280*	*56.1*	*152*	*30.5*	***-128***	***25.60***
Unknown	*13*	*2.6*	*85*	*17.0*	***73***	***14.40***
Waiver Status						
None	*486*	*97.4*	*499*	*100.0*	***13***	***2.60***
Felony	*0*	*0*	*0*	*0.0*	***0***	***0.00***
Serious Misdemeanor	*0*	*0*	*0*	*0.0*	***0***	***0.00***
Minor Misdemeanor	*10*	*2.0*	*0*	*0.0*	***-10***	***2.00***
Other Waiver	*3*	*.6*	*0*	*0.0*	***-3***	***0.60***
Selector AI						
(0 – 9 above selector AI)	*157*	*31.5*	*157*	*31.5*	***0***	***0.00***
(10 – 19 above selector AI)	*117*	*23.4*	*112*	*22.4*	***-5***	***1.00***
(20 + above selector AI)	*183*	*36.7*	*204*	*40.9*	***21***	***4.20***
(Any value below selector AI)	*42*	*8.4*	*26*	*5.2*	***-16***	***3.20***
Gender						
Male	*289*	*57.9*	*256*	*51.3*	***-33***	***6.60***
Female	*210*	*42.1*	*243*	*48.7*	***33***	***6.60***
Race/Ethnicity						
Unknown	*26*	*5.2*	*29*	*5.8*	***3***	***0.60***

Black	*86*	*17.2*	*213*	*42.7*	***127***	***25.50***
White	*338*	*67.7*	*147*	*29.5*	***-191***	***38.20***
Hispanic	*17*	*3.4*	*34*	*6.8*	***17***	***3.40***
Other/Mixed	*32*	*6.4*	*76*	*15.2*	***44***	***8.80***

AFSC and Title	Actual		Optimized		Mean Difference
	Mean	SD	Mean	SD	
1N0X1 Operations Intelligence					
General Science (GS)	55.98	6	52.09	6.36	**-3.89**
Arithmetic Reasoning (AR)	57.06	5.27	45.69	5.77	**-11.37**
Word Knowledge (WK)	56.12	3.57	48.81	5.10	**-7.31**
Paragraph Comprehension (PC)	56.56	3.96	52.26	5.01	**-4.30**
Auto and Shop Information (AS)	46.91	7.01	41.59	5.89	**-5.32**
Math Knowledge (MK)	59.46	5.63	56.69	5.26	**-2.77**
Mechanical Comprehension (MC)	54.24	7.84	46.33	6.96	**-7.91**
Electronics Information (EI)	51.03	7.30	44.59	6.68	**-6.44**

AFSC and Title	Actual		Optimized		Difference	
	N	%	N	%	N	%
1A8X1 Airborne Cryptological Linguist	**238**		**238**			
Education Level						
Unknown	*76*	*31.9*	*0*	*0.0*	***-76***	***31.90***
Less than High School	*1*	*.4*	*0*	*0.0*	***-1***	***0.40***
Alt. Certification	*2*	*.8*	*144*	*60.5*	***142***	***59.70***
High School Diploma	*102*	*42.9*	*92*	*38.7*	***-10***	***4.20***
High School +	*57*	*23.9*	*2*	*0.8*	***-55***	***23.10***
Age at Entry (years)						
17,18	*74*	*31.1*	*170*	*71.4*	***96***	***40.30***
19,20	*83*	*34.9*	*48*	*20.2*	***-35***	***14.70***
21,22	*43*	*18.1*	*13*	*5.5*	***-30***	***12.60***
23,24	*24*	*10.1*	*3*	*1.3*	***-21***	***8.80***
25,26	*11*	*4.6*	*1*	*0.4*	***-10***	***4.20***
27 and over	*3*	*1.3*	*3*	*1.3*	***0***	***0.00***
Accession Category						
4-Year Open, No Bonus	*0*	*0*	*0*	*0.0*	***0***	***0.00***
4-Year Guar., No Bonus	*11*	*4.6*	2	0.8	***-9***	***3.80***
4-Year Guar., With Bonus	*34*	*14.3*	*124*	*52.1*	***90***	***37.80***
6-Year Guar., Acc. Promotions, No Bonus	*1*	*.4*	*0*	*0.0*	***-1***	***0.40***
6-Year Guar., Acc. Promotions, With Bonus	*186*	*78.2*	*112*	*47.1*	***-74***	***31.10***
Unknown	*6*	*2.5*	*0*	*0.0*	***-6***	***2.50***
Waiver Status						
None	*225*	*94.5*	*221*	*92.9*	***-4***	***1.60***
Felony	*0*	*0*	*0*	*0.0*	***0***	***0.00***
Serious Misdemeanor	*0*	*0*	*0*	*0.0*	***0***	***0.00***
Minor Misdemeanor	*11*	*4.6*	*7*	*2.9*	***-4***	***1.70***
Other Waiver	*2*	*.8*	*10*	*4.2*	***8***	***3.40***
Selector AI						
(0 – 9 above selector AI)	*48*	*20.2*	*36*	*15.1*	***-12***	***5.10***
(10 – 19 above selector AI)	*65*	*27.3*	*59*	*24.8*	***-6***	***2.50***
(20 + above selector AI)	*122*	*51.3*	*132*	*55.5*	***10***	***4.20***
(Any value below selector AI)	*3*	*1.3*	*11*	*4.6*	***8***	***3.30***
Gender						
Male	*150*	*63.0*	*204*	*85.7*	***54***	***22.70***
Female	*88*	*37.0*	*34*	*14.3*	***-54***	***22.70***
Race/Ethnicity					***0***	
Unknown	*6*	*2.5*	*16*	*6.7*	***10***	***4.20***

Black	*29*	*12.2*	*73*	*30.7*	***44***	***18.50***
White	*173*	*72.7*	*121*	*50.8*	***-52***	***21.90***
Hispanic	*12*	*5.0*	*7*	2.9	***-5***	***2.10***
Other/Mixed	*18*	*7.6*	*21*	*8.8*	***3***	***1.20***

AFSC and Title	**Actual**		**Optimized**		**Mean Difference**
	Mean	**SD**	**Mean**	**SD**	
1A8X1 Airborne Cryptological Linguist					
General Science (GS)	60.91	4.77	57.50	5.91	**-3.41**
Arithmetic Reasoning (AR)	62.41	3.34	56.82	5.91	**-5.59**
Word Knowledge (WK)	58.85	2.48	55.89	3.87	**-2.96**
Paragraph Comprehension (PC)	59.50	2.62	56.81	3.98	**-2.69**
Auto and Shop Information (AS)	49.59	6.53	48.38	6.91	**-1.21**
Math Knowledge (MK)	63.68	3.85	57.78	6.58	**-5.90**
Mechanical Comprehension (MC)	59.45	6.55	57.10	7.89	**-2.35**
Electronics Information (EI)	55.12	6.77	52.48	7.60	**-2.64**

AFSC and Title	Actual		Optimized		Difference	
	N	%	N	%	N	%
1C6X1 Space Systems Operations	**181**		**181**			
Education Level						
Unknown	*45*	*24.9*	*64*	*34.8*	***19***	***9.90***
Less than High School	*0*	*0*	*29*	*15.8*	***29***	***15.80***
Alt. Certification	*1*	*6*	*0*	*0.0*	***-1***	***6.00***
High School Diploma	*110*	*60.8*	*91*	*49.5*	***-19***	***11.30***
High School +	*25*	*13.8*	*0*	*0.0*	***-25***	***13.80***
Age at Entry (years)						
17,18	*80*	*44.2*	*21*	*11.4*	***-59***	***32.80***
19,20	*58*	*32.0*	*33*	*17.9*	***-25***	***14.10***
21,22	*22*	*12.2*	*98*	*53.3*	***76***	***41.10***
23,24	*9*	*5.0*	*32*	*17.4*	***23***	***12.40***
25,26	*7*	*3.9*	*0*	*0.0*	***-7***	***3.90***
27 and over	*5*	*2.8*	*0*	*0.0*	***-5***	***2.80***
Accession Category						
4-Year Open, No Bonus	*0*	*0*	*0*	*0.0*	***0***	***0.00***
4-Year Guar., No Bonus	*23*	*12.7*	0	0.0	***-23***	***12.70***
4-Year Guar., With Bonus	*39*	*21.5*	*48*	*26.1*	***9***	***4.60***
6-Year Guar., Acc. Promotions, No Bonus	*8*	*4.4*	*9*	*4.9*	***1***	***0.50***
6-Year Guar., Acc. Promotions, With Bonus	*111*	*61.3*	*107*	*58.2*	***-4***	***3.10***
Unknown	*0*	*0*	*20*	*10.9*	***20***	***10.90***
Waiver Status						
None	*169*	*93.4*	*133*	*72.3*	***-36***	***21.10***
Felony	*0*	*0*	*2*	*1.1*	***2***	***1.10***
Serious Misdemeanor	*4*	*2.2*	*0*	*0.0*	***-4***	***2.20***
Minor Misdemeanor	*5*	*2.8*	*34*	*18.5*	***29***	***15.70***
Other Waiver	*3*	*1.7*	*15*	*8.2*	***12***	***6.50***
Selector AI						
(0 – 9 above selector AI)	*81*	*44.8*	*15*	*8.2*	***-66***	***36.60***
(10 – 19 above selector AI)	*41*	*22.7*	*22*	*12.0*	***-19***	***10.70***
(20 + above selector AI)	*44*	*24.3*	*144*	*78.3*	***100***	***54.00***
(Any value below selector AI)	*15*	*8.3*	*3*	*1.6*	***-12***	***6.70***
Gender						
Male	*139*	*76.8*	*151*	*83.4*	***12***	***6.60***
Female	*42*	*23.2*	*30*	*16.6*	***-12***	***6.60***
Race/Ethnicity						
Unknown	*14*	*7.7*	*6*	*3.3*	***-8***	***4.40***

Black	*38*	*21.0*	*35*	*19.3*	***-3***	***1.70***
White	*100*	*55.2*	*108*	*59.7*	***8***	***4.50***
Hispanic	*15*	*8.3*	*8*	*4.4*	***-7***	***3.90***
Other/Mixed	*14*	*7.7*	*24*	*13.3*	***10***	***5.60***

AFSC and Title	Actual		Optimized		Mean Difference
	Mean	SD	Mean	SD	
1C6X1 Space Systems Operations					
General Science (GS)	55.76	6.01	58.65	5.73	**2.89**
Arithmetic Reasoning (AR)	55.13	6.32	61.19	4.68	**6.06**
Word Knowledge (WK)	53.35	4.63	57.64	3.94	**4.29**
Paragraph Comprehension (PC)	53.71	5.24	57.56	4.33	**3.85**
Auto and Shop Information (AS)	47.99	6.89	50.32	7.24	**2.33**
Math Knowledge (MK)	59.54	4.96	59.76	6.78	**0.22**
Mechanical Comprehension (MC)	54.083	8.13	56.91	8.67	**2.83**
Electronics Information (EI)	53.26	6.09	55.45	7.01	**2.19**

AFSC and Title	Actual		Optimized		Difference	
	N	%	N	%	N	%
2A3X2 F-16, F-117, RQ-1, CV-22 Avionic Systems	**499**		**499**			
Education Level						
Unknown	*198*	*39.7*	*59*	*8.4*	***-139***	***31.30***
Less than High School	*4*	*.8*	*0*	*0.0*	***-4***	***0.80***
Alt. Certification	*2*	*.4*	*0*	*0.0*	***-2***	***0.40***
High School Diploma	*250*	*50.1*	*422*	*87.4*	***172***	***37.30***
High School +	*45*	*9.0*	*18*	*4.2*	***-27***	***4.80***
Age at Entry (years)						
17,18	*229*	*45.9*	*188*	*19.4*	***-41***	***26.50***
19,20	*157*	*31.5*	*260*	*54.7*	***103***	***23.20***
21,22	*61*	*12.2*	*23*	*7.6*	***-38***	***4.60***
23,24	*28*	*5.6*	*20*	*14.6*	***-8***	***9.00***
25,26	*16*	*3.2*	*1*	*1.2*	***-15***	***2.00***
27 and over	*8*	*1.6*	*7*	*2.4*	***-1***	***0.80***
Accession Category						
4-Year Open, No Bonus	*3*	*.6*	*15*	*3.0*	***12***	***2.40***
4-Year Guar., No Bonus	*10*	*2.0*	*0*	*0.0*	***-10***	***2.00***
4-Year Guar., With Bonus	*63*	*12.6*	*52*	*10.4*	***-11***	***2.20***
6-Year Guar., Acc. Promotions, No Bonus	*0*	*0*	*0*	*0.0*	***0***	***0.00***
6-Year Guar., Acc. Promotions, With Bonus	*409*	*82.0*	*431*	*86.4*	***22***	***4.40***
Unknown	*14*	*2.8*	*1*	*0.2*	***-13***	***2.60***
Waiver Status						
None	*456*	*91.4*	*484*	*97.0*	***28***	***5.60***
Felony	*4*	*.8*	*0*	*0.0*	***-4***	***0.80***
Serious Misdemeanor	*10*	*2.0*	*2*	*0.4*	***-8***	***1.60***
Minor Misdemeanor	*18*	*3.6*	*4*	*0.8*	***-14***	***2.80***
Other Waiver	*11*	*2.2*	*9*	*1.8*	***-2***	***0.40***

Selector AI						
(0 – 9 above selector AI)	*195*	*39.1*	*277*	*55.5*	***82***	***16.40***
(10 – 19 above selector AI)	*130*	*26.1*	*124*	*24.8*	***-6***	***1.30***
(20 + above selector AI)	*85*	*17.0*	*50*	*10.0*	***-35***	***7.00***
(Any value below selector AI)	*89*	*17.8*	*48*	*9.6*	***-41***	***8.20***
Gender						
Male	*473*	*94.8*	*341*	*68.3*	***-132***	***26.50***
Female	*26*	*5.2*	*158*	*31.7*	***132***	***26.50***
Race/Ethnicity						
Unknown	*17*	*3.4*	*25*	*5*	***8***	***1.60***
Black	*75*	*15.0*	*221*	*44.3*	***146***	***29.30***
White	*343*	*68.7*	*139*	*27.9*	***-204***	***40.80***
Hispanic	*32*	*6.4*	*43*	*8.6*	***11***	***2.20***
Other/Mixed	*32*	*6.4*	*71*	*14.2*	***39***	***7.80***

AFSC and Title	**Actual**		**Optimized**		**Mean Difference**
	Mean	**SD**	**Mean**	**SD**	
2A3X2 F-16, F-117, RQ-1, CV-22 Avionic Systems					
General Science (GS)	58.52	4.80	39.88	3.58	**-18.64**
Arithmetic Reasoning (AR)	58.18	5.38	47.51	4.35	**-10.67**
Word Knowledge (WK)	55.03	3.87	50.06	3.76	**-4.97**
Paragraph Comprehension (PC)	55.65	5.17	49.81	5.27	**-5.84**
Auto and Shop Information (AS)	52.59	7.73	43.11	6.39	**-9.48**
Math Knowledge (MK)	60.55	4.67	51.78	5.29	**-8.77**
Mechanical Comprehension (MC)	58.29	7.14	45.69	6.54	**-12.60**
Electronics Information (EI)	56.31	6.18	41.15	5.61	**-15.16**

AFSC and Title	Actual		Optimized		Difference	
	N	%	N	%	N	%
2M0X3 Missile & Space Facilities	**184**		**184**			
Education Level						
Unknown	*45*	*24.5*	*50*	*27.2*	***5***	***2.70***
Less than High School	*1*	*.5*	*9*	*4.9*	***8***	***4.40***
Alt. Certification	*3*	*1.6*	*0*	*0.0*	***-3***	***1.60***
High School Diploma	*128*	*69.6*	*124*	*67.4*	***-4***	***2.20***
High School +	*7*	*3.8*	*1*	*0.5*	***-6***	***3.30***
Age at Entry (years)						
17,18	*99*	*53.8*	*32*	*17.4*	***-67***	***36.40***
19,20	*64*	*34.8*	*38*	*20.7*	***-26***	***14.10***
21,22	*16*	*8.7*	*87*	*47.3*	***71***	***38.60***
23,24	*4*	*2.2*	*13*	*7.1*	***9***	***4.90***
25,26	*1*	*.5*	*10*	*5.4*	***9***	***4.90***
27 and over	*0*	*0*	*4*	*2.2*	***4***	***2.20***
Accession Category						
4-Year Open, No Bonus	*3*	*1.6*	*0*	*0.0*	***-3***	***1.60***
4-Year Guar., No Bonus	*5*	*2.7*	*2*	*1.1*	***-3***	***1.60***
4-Year Guar., With Bonus	*21*	*11.4*	*24*	*13.0*	***3***	***1.60***
6-Year Guar., Acc. Promotions, No Bonus	*0*	*0*	*6*	*3.3*	***6***	***3.30***
6-Year Guar., Acc. Promotions, With Bonus	*155*	*84.2*	*141*	*76.6*	***-14***	***7.60***
Unknown	*0*	*0*	*11*	*6.0*	***11***	***6.00***
Waiver Status						
None	*174*	*94.6*	*51*	*27.7*	***-123***	***66.90***
Felony	*0*	*0*	*0*	*0.0*	***0***	***0.00***
Serious Misdemeanor	*0*	*0*	*0*	*0.0*	***0***	***0.00***
Minor Misdemeanor	*5*	*2.7*	*132*	*71.7*	***127***	***69.00***
Other Waiver	*5*	*2.7*	*1*	*0.5*	***-4***	***2.20***
Selector AI						
(0 – 9 above selector AI)	*113*	*61.4*	*37*	*20.1*	***-76***	***41.30***
(10 – 19 above selector AI)	*42*	*22.8*	*41*	*22.3*	***-1***	***0.50***
(20 + above selector AI)	*29*	*15.8*	*96*	*52.2*	***67***	***36.40***
(Any value below selector AI)	*0*	*0*	*10*	*5.4*	***10***	***5.40***
Gender						
Male	*162*	*88.0*	*178*	*96.7*	***16***	***8.70***
Female	*22*	*12.0*	*6*	*3.3*	***-16***	***8.70***
Race/Ethnicity						
Unknown	*11*	*6.0*	*7*	*3.8*	***-4***	***2.20***

Black	*80*	*43.5*	*18*	*9.8*	***-62***	***33.70***
White	*66*	*35.9*	*132*	*71.7*	***66***	***35.80***
Hispanic	*6*	*3.3*	*10*	*5.4*	***4***	***2.10***
Other/Mixed	*21*	*11.4*	*17*	*9.2*	***-4***	***2.20***

AFSC and Title	**Actual**		**Optimized**		**Mean Difference**	
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**
2M0X3 Missile & Space Facilities						
General Science (GS)	52.65	5.65	62.72	4.70	**10.07**	
Arithmetic Reasoning (AR)	50.43	6.34	61.11	5.61	**10.68**	
Word Knowledge (WK)	49.76	5.35	57.39	4.13	**7.63**	
Paragraph Comprehension (PC)	50.62	6.00	55.86	6.66	**5.24**	
Auto and Shop Information (AS)	45.24	6.58	55.87	6.93	**10.63**	
Math Knowledge (MK)	57.87	4.88	62.96	5.05	**5.09**	
Mechanical Comprehension (MC)	49.05	7.41	63.57	5.02	**14.52**	
Electronics Information (EI)	50.26	6.12	61.39	4.98	**11.13**	